

THE
BRITISH JOURNAL
OF
CHILDREN'S DISEASES.

VOL. XIV.

JANUARY—MARCH, 1917.

Nos. 157-159.

Original Articles.

MALFORMATION OF THE ŒSOPHAGUS.

By EDMUND CAUTLEY, M.D. Cantab., F.R.C.P. Lond.

MALFORMATIONS of the œsophagus are of sufficient rarity to make each case worth recording, although it may be of the most common type, as in the present instance. That it is rare is shown by the fact that in the course of twenty-five years of hospital practice, mainly among children, only one case has come under my notice, and curiously this one happens to be in the child of a Belgian refugee. Possibly they are more common than supposed, for I have at present under observation a baby who exhibits in an X-ray photograph distinct dilatation of the lower third of the œsophagus and symptoms of œsophageal stricture. Shukowsky saw only one case in 50,000 newborns.

Morell Mackenzie (1884) collected 62 cases, in a review of the literature extending back to 1670, and added one of his own. On the other hand, Hirschsprung (1892) saw 14 cases, 11 verified post-mortem, and 7 occurred in a Copenhagen lying-in hospital in sixteen years. He saw 4 cases within seven months.

Happich (1905) tabulated 59 cases of the common type. Griffith and Lavenson (1909) found 14 published in the previous six years, 12 of them since Happich's paper. Since then, cases of the common type have been recorded by Brennemann, 3 seen within a year Pollak; Richter (1913), not mentioned by Griffith; Shukowsky and

Baron ; Villiard and Le Mée (1907). Cases of other types have also been reported by Morse, Dun, Pritchard and Drew, Rogers, Whipham and Fagge, Rotch, and Umber.

Malformations of this region may be subdivided into various groups, as follows :

I. *Complete absence*, generally associated with gross malformations as in monsters ; 8 cases are on record.

- (1) Cooper : ' *Traité d'Anat. path.*, i., p. 475 (quoted by Griffith and Lavenson).
- (2) Heath : ' *London Med. Gaz.*, 1840, xxvi, p. 543 (a brief reference only).
- (3) Lozach : ' *Journ. Univ. des Sci. Méd.*, 1816, iii, p. 187.
- (4) Mackenzie : ' *Diseases of the Throat and Nose*, 1884, ii, p. 217.
- (5) Mellor : ' *London Med. Gaz.*, 1840, xxvi, p. 542.
- (6) Mondière : ' *Hufeland's Journal*, 1820, L. ii, p. 123 (quoted by Griffith and Lavenson).
- (7) Sonderland : ' *Harless's Rheinische Jahrbücher*, 1819, i, p. 198 ; and ' *Hufeland's Journal*, 1820, ii, p. 133.
- (8) Tiedemann : ' *Anatomie kopfloser Missgeburten*' (quoted by Schœller).

II. *Double œsophagus*, with reunion at the lower end, is still more rare. Blasius published one such case. In Kathe's case there appeared to be a narrow supplemental lumen in the wall of the tube.

- (1) Blasius : ' *Observata anatom. pract. in homine*, Ludg. Batav. et Amster., 1674, Tab. XV, fig. 6.
- (2) Kathe : ' *Virchow's Archiv*, 1907, cxc, p. 78.

III. *Diverticula or pouches*, pharyngeal rather than œsophageal, being situated posteriorly at the junction of the pharynx and œsophagus. They are found in later life, more often in men than women, and not in children. Possibly there may be a primary congenital weakness or deficiency of muscle at the point of origin, or they may develop from an imperfectly closed branchial fissure.

IV. *Cysts* have been described by Hebb and H. M. Fletcher. Hebb's specimen is in the museum of the Royal College of Surgeons. It is about 20 mm. in diameter, lined by epithelium like that of the trachea, with a wall chiefly of muscular tissue and mucous membrane. It was obtained from a woman, aged 31 years, who died from heart disease, and was situated in the upper part of the œsophagus, in the angle between it and the trachea, about $1\frac{1}{2}$ in. below the left lobe of the thyroid. It arose during separation of the trachea from the œsophagus.

Fletcher described his specimen, from a girl aged 6 years, who died from pertussis and broncho-pneumonia, as probably a foetal outgrowth from the œsophagus, not from the bronchus. It was situated behind the right bronchus and in fibrous communication with the trachea, filled with glairy mucus, lined with ciliated epithelium and with a wall of unstriped muscle.

V. *Tracheo-œsophageal fistula*, without other abnormality, is also rare. Apparently only 6 are on record.

- (1) Eppinger: 'Path. Anat. d. Larynx u. d. Trachea,' 1880, p. 252.
- (2) Lamb: 'Philadel. Med. Times,' 1873, iii, p. 705.
- (3) Pinard and Tarnier: 'Bull. Soc. Anat.,' 1873, xlviii, pp. 682, 685 (Pinard); and 'Gaz. des Hôp.,' 1873, xlvi, p. 1099 (Tarnier).
- (4) Richter: 'Inaug. Dissert.,' Leipzig, 1792.
- (5) Von der Water: 'Inaug. Dissert.,' Leyden, 1857.
- (6) Vrolik: 'Tabulæ ad illustrandam embryogen.,' Amst., 1849, Tab. 89, fig. 2.

VI. *Congenital dilatation* was first described by Arnold and by Luschka. It is generally limited to the portion just above the diaphragm, though perhaps not involving about $\frac{1}{2}$ – $\frac{3}{4}$ in. of the extreme cardiac end. Zenker reported simple dilatation in a 7-month infant, who died on the seventh day of life. Rotch has recorded it in a girl, 10 weeks old. Regurgitation, vomiting, and wasting came on at 4 weeks of age. She was weaned at 9 weeks, and died from rapid loss of weight and exhaustion. There was a cylindrical dilatation of the last two inches of the œsophagus, with marked atrophy of the mucous membrane and thinning of the walls, and commencing perforation at one spot. Umber records a case of diffuse dilatation of the upper and lower parts of the tube. Most instances of dilatation are secondary to spasm or stricture. A few appear to depend on congenital atony or defect of the wall. Possibly they are analogous to congenital dilatation and hypertrophy of the large intestine. In Blasius's case the dilatation affected the lower three inches of the gullet, just above the diaphragm. Most of the cases occur after infancy. Food is returned some hours after being swallowed, and is alkaline or neutral, and undigested. Pain is induced by the distension and is relieved by vomiting or regurgitation; and the breath may be very offensive from decomposition of retained food.

- (1) Arnold: 'Untersuch. im Gebiete f. Anat. u. Phys.,' 1838, p. 211.

- (2) Blasius: 'Obs. med. anat. rarior.,' pars. iv, obs. ix. Lugdun. Batav., 1711, p. 53; *ibid.*, p. 113, Tab. VI, fig. 5.
- (3) Luschka: 'Virchow's Archiv.,' 1868, xlii, p. 473.
- (4) Rotch: 'Pediatrics,' "The Treatment of Children," 1896, ii, 836.
- (5) Umber: 'Archiv f. Verd.-Krankheit.,' 1910, xvi, p. 26.
- (6) Zenker: Ziemssen's 'Cyclopædia of Pract. Med.,' viii, pp. 47, 51.

VII. *Atresia without fistulous communication with the trachea* is of various types. It may take the form of a localised narrowed portion forming a stricture of varying degree of severity about an inch from the cardiac end; or there may be complete atresia of a portion of the tube, the upper *cul-de-sac* being united by a fibrous cord to the lower third; or a mere trace of this uniting cord is found in the posterior wall of the trachea on microscopical examination.

(a) *Atresia or Stricture*.—An upper œsophageal sphincter was noted by Sir Everard Home. It is relaxed on swallowing. Mackenzie states that Blasius recorded the earliest example of simple stenosis; and that Home described some cases of uniform circular contraction behind the cricoid cartilage. Yet Mackenzie was unaware of its existence in early life having been proved by post-mortem examination. Cases of this type have been reported in recent years by Bertram Rogers in a male, aged 22 months old, with a fairly tight stricture about an inch above the diaphragm; Dun, in a male, aged 33 months old, with a short and sudden constriction an inch above the diaphragm; Whipham and Fagge, in a girl, aged 4½ years, with a stricture about an inch above the cardiac end of the stomach, and a history of vomiting after food for nearly all her life; Pritchard and Drew, in a male, aged 2 years old, delicate from birth, subject to vomiting and unable to swallow solid food, with dilatation of the œsophagus between the level of the suprasternal notch and xiphisternum and a stenosed portion below.

The last-mentioned writers refer to 7 previous cases reported in Ziemssen's 'Cyclopedia,' two of them living to the ages of 74 and 84 years. A fair number of other cases are on record, but it is not always clear that they were congenital in origin. Keith (1910), states that there are 4 specimens of non-cicatricial stenosis of the upper end in the museum of the Royal College of Surgeons and 5 in the museums of other London hospitals; 2 cases of stenosis of the mid-œsophagus and 4 of stenosis of the lower end, with dilatation, in London hospital museums; and 2 of

stenosis of the lower end in the museum of the Royal College of Surgeons. Rotch reports a stenosis of the lower third in a boy, 25 months old, with vomiting since birth.

- (1) Baillie : 'Traité d'Anat. path.,' 1903, p. 98.
- (2) Bauerfeind : 'Inaug. Dissert.,' München, 1893.
- (3) Blasius : 'Observata medica rariora,' Amst. 1677, iv, Tab. VI, fig. 2.
- (4) Brenner : 'Beitr. z. Chir., Billroth-Festschrift,' 1892, p. 206.
- (5) Crary : Quoted by Kraus, *q. v.*
- (6) Cruveilhier : 'Anat. path. du Corps humain,' 1835-42, T. II, L. xxxviii, pl. 6 ; and 'Traité d'Anat. path. gén.,' 1849, Tab. II, p. 232.
- (7) Demme : Quoted by Korman, 'Berichte u. d. Jennersche Kinderspital z. Bern.
- (8) Dun : 'Reps. Soc. Dis. in Children,' 1905, v, p. 218.
- (9) Fagge : 'Guy's Hosp. Reps.,' 1872, xvii, p. 413.
- (10) Gianella : 'De Dysphagia. Institut. med. pract.,' iv, p. 292.
- (11) Hirschsprung : 'Inaug. Dissert.,' Kopenhagen, 1861 ; 'Hospitalstidende,' 1895, 4 R., iii, 1037.
- (12) Keith : 'Brit. Med. Journ.,' 1910, i, p. 301.
- (13) Mayer : 'Amer. Journ. Med. Sci.,' 1893, cvi, p. 567.
- (14) Pritchard and Drew : 'Proc. Roy. Soc. Med.,' 1912, vi, Child. Sect., p. 33.
- (15) Rogers : 'Reps. Soc. Dis. in Child.,' 1904, iv, 313 ; and BRITISH JOURNAL OF CHILDREN'S DISEASES, 1904, i, p. 390.
- (16) Rotch : 'Amer. Journ. Dis. Child.,' 1913, vi, p. 1.
- (17) Schneider : 'Inaug. Dissert.,' Königsburg, 1900.
- (18) Siegert : 'Inaug. Dissert.,' Halle, 1856.
- (19) Tenon : 'La méd. éclairée par les sciences phys.,' Tab. I, p. 301.
- (20) Thomas : 'Birmingham Med. Review,' 1904, iii, p. 83.
- (21) Turner : 'Trans. Path. Soc.,' London, 1885, xxxvi, p. 185.
- (22) Wadstein : 'Nord. med. Ark.,' 1894, N.F. iv, Hft. 4, p. 25.
- (23) Whipham and Fagge : 'Lancet,' 1905, i, p. 22.
- (24) Wilks : 'Trans. Path. Soc.,' London, 1866, xvii, p. 138.
- (25) Worthington : 'Med.-Chir. Trans.,' 1847, xxx, p. 199.
- (26) Zenker : 'Zenker u. Ziemssen, Oesophaguskrankh.,' Leipzig, 1874, p. 19.

(b) *Upper part normal, or forming a cul-de-sac, and the lower portion forming a fibrous cord or more or less completely obliterated.* In Phillips's case microscopical examination was required to reveal the presence of oesophageal tissue in the posterior part of the trachea.

Non-obliteration of the lumen and union of the two ends by a cord or band; rather more common than the last variety. Cases of these two types have been reported by several observers.

- (1) Brodie: 'Bibliotheca medica,' 1810, p. 381 (quoted by Griffith and Lavenson).
- (2) van Cruyck: 'Bull. Soc. Méd. d'émulation de Paris,' 1824, p. 23.
- (3) Durston: 'Collect. Academ. Part. étrang.,' 1670, Tab. II, p. 283; the first recorded case of malformation of the œsophagus.
- (4) Kraus (3 cases): 'Nothnagel's Spec. Path. u. Therap.,' 1902, xvi, p. 93.
- (5) Lallemand: 'Thèse de Paris,' 1816.
- (6) Lichty: 'Journ. Amer. Med. Assoc.,' 1896, xxvii, p. 430.
- (7) Marrigues: 'Mém. de math. Préc.,' Tab. VI, p. 123 (quoted by Happich).
- (8) Marsh: 'Amer. Journ. Med. Sci.,' 1902, cxxiv, p. 304.
- (9) Pagenstecher: v. Siebold's 'Journ. f. Geburtshülfe, etc.,' 1830, Bd. ix, p. 112.
- (10) Phillips (2 cases): 'Arch. of Pediat.,' 1908, xxv, p. 267.
- (11) Röderer: 'Fetus parasitici descr. in Comm. Soc. reg. Goetting; ad Annal.,' 1754, Tab. III, p. 113 (quoted by Griffith and Lavenson).
- (12) Schöeller: 'Neue Zeitsch. f. Geburtstk.,' 1838, vi, p. 264.
- (13) Shattock: 'Trans. Path. Soc.,' London, 1890, xli, p. 87.
- (14) Steele: 'Lancet,' 1888, ii, p. 764.
- (15) Toujan: 'Ann. de Gyn. et d'Obstét.,' 1892, xxxviii, p. 38.
- (16) Warner: 'Lancet,' 1839, ii, p. 463.
- (17) Weill and Péhu: 'Lyon Méd.,' 1901, xcvi, p. 313.

Morse ('Arch. of Pediat.,' 1912, xxix, p. 485), has reported 3 cases, possibly of this type. A post-mortem examination of one showed an upper pouch, fibrous cord, and reappearance of œsophagus just before it reached the cardiac end of the stomach.

VIII. *Atresia, with the lower end of the œsophagus opening into the trachea, and very rarely into a bronchus.*—The majority of cases are of this type, and remarkably alike in their anatomical appearances. Mackenzie's 63 cases are divisible into the following groups:

- A. Type VIII, 40 cases.
- B. Similar to Type VIII, but the lower end opening into a bronchus, 3 cases.
- C. Type VII, 9 cases; simple blind termination.

D. Type V, 2 cases ; tracheo-œsophageal fistula.

E. Membranous obstruction in 3 cases.

F. Complete absence in 5, *plus* extreme general malformation.

Happich tabulates (1905), 59 cases of Type VIII, and states that other malformations were present in 28 of them ; and, as mentioned in the earlier part of the paper, others have been reported since, making in all with the present one a total 85

For references see Happich : 'Inaug. Dissert.,' Marburg, 1905, and—

- (1) Brennemann : 'Amer. Journ. Dis. Child.,' 1913, v, p. 143 (3 cases in a year).
- (2) Dam : 'Rev. Mens. des Mal. de l'Enf.,' 1906, xxiv, p. 453. He classifies cases collected by Legrande into (a) Two cases of obstruction by membrane or diaphragm ; (b) Four cases of an upper *cul-de-sac* and complete obstruction without fistula ; (c) Forty-two instances of an upper *cul-de-sac* and the lower end of the œsophagus opening into the trachea ; and adds two more of this type.
- (3) Dickie : BRITISH JOURNAL OF CHILDREN'S DISEASES, 1906, iii, p. 451 (1 case, and found only 13 additional to those collected by Mackenzie).
- (4) Edington : 'Glasgow Med. Journ.,' 1913, lxxx, p. 16.
- (5) Fischer : 'Zentralb. f. allg. Path. u. path. Anat.,' 1905, xvi, p. 1.
- (6) 'Gibson's Anatomy,' fifth edition, 1697.
- (7) Giffhorn : 'Virchow's Archiv,' 1908, cxcii, Bd. I, p. 112 (2 cases).
- (8) Griffith and Lavenson : 'Arch. of Ped.,' 1909, xxvi, p. 161.
- (9) Guillemet : 'Gaz. méd. de Nantes,' 1906, 2me sér., xxiv, p. 576.
- (10) Guyot : 'Bull. et Mém. Soc. Anat. de Paris,' 1907, lxxxii, p. 384.
- (11) Keith and Spicer : 'Journ. Anat. and Phys.,' 1906, xli, p. 52 (3 cases, with a right aortic arch or its representative present in all).
- (12) Kirmisson : 'Bull. et Mém. de la Soc. de Chir. de Paris,' 1904, xxx, p. 745 (the lower end of the tube opening into a bronchus).
- (13) Legrande : 'Thèses de Paris,' 1896-7, No. 234.
- (14) Patron : 'Gaz. méd. de Nantes,' 1906, xxiv, p. 573.
- (15) Phillips : 'Arch. of Ped.,' 1908, xxv, p. 267 (states only 75 cases are recorded).

- (16) Pollak : 'Jahrb. f. Kinderheilk.,' 1913, lxxviii, p. 93.
- (17) Renaut and Sebillieu : 'Bull. Méd.,' 1904, xviii, p. 479.
- (18) Richter : 'Surg., Gynecol., and Obstet.,' 1913, xvii, p. 397.
- (19) Shukowsky and Baron : 'Arch. f. Kinderheilk.,' 1912, lviii, p. 191.
- (20) Spicer : 'Lancet,' 1907, i, p. 157.
- (21) Thomas : 'Birmingham Med. Review,' 1904, new ser., iii, p. 83; and 'Lancet,' 1904, i, p. 361.
- (22) Vieliard and Le Mée : 'Rev. Mens. des Mal. de l'Enf.,' 1906, xxiv, p. 554.
- (23) Villemin : 'Bull. et Mém. de la Soc. de Chir. de Paris,' 1904, xxx, p. 730.

Keith (1910) states that there are 4 specimens of malformation of the tracheo-œsophageal septum in the Royal College of Surgeons' Museum, and 9 in the museums of other London hospitals.

To this list may be added the case under my care, that of a boy, son of Belgian refugees. He weighed 4 lb. 13 oz. on the first day of life and died at the age of 5 days from starvation and general bronchitis. It was remarkable that he only lost 10 oz. in weight during this period, in spite of the fever and lack of fluid ingesta. The anatomical condition was similar to that so often described, viz. a *cul-de-sac* ending about 1½ in. below the level of the glottis, and the lower patent portion of the œsophagus opening into the posterior surface of the trachea about half an inch above the bifurcation. The posterior wall of the œsophagus blends with that of the trachea.

The anatomical conditions and various views as to the mode of development of this malformation are well described by Shattock, Dickie, Keith, and others. It appears to be due to failure of development of the tracheo-œsophageal septum. Possibly, simple stenosis or atresia is due to failure of canalisation. The *cul-de-sac* has normal walls and ends in a rounded extremity. It extends for 3-5 cm. from the glottis downwards, and ends 1-1.5 cm. above the bifurcation of the trachea. Occasionally it overlaps the lower end. Its diameter is 1-1.5 cm. The fistulous opening is slit-like.

Ballantyne : 'Antenatal Pathology and Hygiene—The Embryo,' 1904, p. 46.

Dickie : BRITISH JOURNAL OF CHILDREN'S DISEASES, 1906, iii, p. 451.

Edington : 'Glasgow Med. Journ.,' 1913, lxxx, p. 16.

Forssner : 'Anatomische Hefte,' 1907, xxxiv, pp. 1-163.

Keith and Spicer : 'Journ. of Anat. and Phys.,' 1906, lxi, p. 52.

Keith: 'Brit. Med. Journ.,' 1910, i, p. 301.

Lewis: 'Keibel and Mall's 'Manual of Embryology,' 1912, ii, p. 313.

Schneider: Schwalbe's 'Morphologie der Missbildungen des Menschen und der Tiere,' 1912.

Shattock: 'Trans. Path. Soc.,' London, 1890, lxi, p. 87.

The *symptoms* are characteristic and the *diagnosis* is easy. On account of the obstruction, fluids by mouth are regurgitated through the mouth and nose. The accumulated mucus and saliva trickle from the mouth and nose, and appear as a bubbly secretion at the exterior nares from being mixed with air from the lungs. Attacks of suffocation and cyanosis occur, probably as the result chiefly of the regurgitation of fluids from the stomach into the trachea, and sometimes from fluid passing from the mouth through the glottis. The passage of a catheter reveals obstruction: in the common type at a distance of 10–12 cm. from the gums. In Type VIII the stomach may be distended with air, passing into it from the trachea, and stand out as a prominent swelling in the upper half of the abdomen, the lower half being retracted and empty. Bronchitis or broncho-pneumonia is often present. Death ensues in a few days, usually four to five; but life has been prolonged by gastrostomy for as long as fourteen days. I do not consider operation justifiable, except for simple stenosis, as in Type V (a), in which the stricture is generally seated about an inch above the diaphragm. Possibly the reason for this being the usual site lies in the mode of development. It suggests to my mind that the lower inch or less is developed as a portion of the stomach, and that the stricture indicates the point of union of stomach and œsophagus. The treatment consists in dilatation by graduated bougies.

FURTHER REFERENCES.

AHLFELD.—(A) 'Lehrbuch der Geburtshilfe,' 1894; (B) 'Die Missbildungen des Menschen,' 1880.

BIRNBAUM.—'Klinik der Missbildungen u. kongenitalen Erkrankungen,' 1909, p. 122.

CANNAN AND BERG.—'Arch. gén. de Med.,' 1826, p. 79 (quoted by Griffith and Lavenson).

FOLLIN.—'Bull. della Soc. Med.,' 1853, xix, p. 267.

HEBB.—'Trans. Path. Soc. London,' 1898, xlix, p. 88.

HOFFMANN.—'Inaug. Dissert. Greifsw.,' 1899.

HOME.—'Bibliotheca medica,' T. viii, p. 260 (quoted by Griffith and Lavenson).

MARTIN.—'Exposé des Trav. de la Soc. Roy. de Méd. de Marseille,' 1821, p. 44.

ROTHSCHILD.—'Traité de l'Hygiène et de Pathologie du Nourisson,' 1905.

ROSSI.—'Mem. dell' Acad. d. Sci. di Torino, 1826, xxx, ser. i, p. 155.

SCHWALBE.—'Missbildungen' (2 cases).

TARNIER.—'Gaz. Méd. de Paris,' 1866, xxi, p. 479.

VIGOT.—'Assoc. franç. pour l'avancement des Sci.,' 1894, Conférence de Paris, 206 (quoted by Kraus).

WUNSCH.—'Med. Klinik,' Berlin, 1907, iii, p. 389.

ZEIT.—'Journ. Med. Research,' 1912, xxvii, p. 45.

THE INFECTIVE THEORY OF ACUTE LEUKÆMIA.

By GORDON WARD, M.D.

THE theory that leukæmia is due to infection seems to derive most support from the acuter cases. Such cases are not infrequently admitted to fever hospitals, sometimes because of purpura and general symptoms and sometimes owing to a definite membrane on the throat which closely resembles that of diphtheria.

Admitting that no infective agent has yet been described and gained anything approaching general acknowledgment as the cause of leukæmia, it may be worth while to consider how far ascertained facts about this disease point to its infective nature. It is proposed to bring forward some facts which emerge from a somewhat superficial analysis of 1457 cases of leukæmia of all varieties on which the writer has been lately engaged in such spare time as military service provides. This series includes cases described in many countries, but the majority are British.

CONGENITAL CASES.

Granting that a disease is infective, we should expect that congenital cases would only occur when one of the parents was affected, and we should explain their occurrence by actual intra-uterine transference of the causal organism or by infection very soon after birth—so soon, perhaps, that one would not be able to recognise it as certainly a post-natal infection. We should not, however, expect an infective disease to be present in the new-born child unless some parental or very closely associated focus of infection was discoverable. Now in this series are six cases of congenital leukæmia, and other cases are on record, but the exigencies of war service have not permitted reference to them. These are the cases of Zuccola (31), Sängér (18), Siefert (21), Lommel (12), Stuhl (25), and Pollmann (15). The case of Sängér was still-born, and showed a large spleen and "many lymphomatous infiltrations." Pollmann's case lived nineteen days, that of Zuccola twenty-one days (both of

these were females, the rest males), and that of Lommel one month. In two cases it is noted that the mother was not leukæmic; in no case is it stated that she was—a fact that could hardly have escaped reference if it had been so.

Pollmann's report is the fullest I have seen—the case is described as acute lymphæmia. The cervical, axillary, inguinal, and mesenteric lymph-glands were enlarged, and also the spleen, liver, and thymus. There was infiltration of heart and kidney. Purpura was present, and throughout its life the child was in a state of depressed vitality. This was in part accounted for by a congenital heart lesion.

In Zuccola's case there was hæmorrhage from the nose and gums as well as purpura. The glands were enlarged as well as the liver and spleen, and the case was apparently one of acute myelæmia.

Congenital syphilis was present in Stuhl's case.

There is here, then, evidence that the congenital variety is not clinically different from the ordinary acute type, but there is no evidence of any source of infection in the mother or elsewhere. We may look at the matter from another point of view, viz. as to whether leukæmic mothers do, as a matter of fact, have leukæmic children.

LEUKÆMIC MOTHERS.

In this series are fifteen cases of leukæmia in pregnancy as well as four in which the disease was first recognised soon after parturition. There is no single case in which the child was said to be leukæmic, except the case of Cameron (3). This latter case or series of cases, for there was a whole family of "leukæmic" children—not to mention other relatives—is of interest also, as being the basis for statements that leukæmia may be hereditary.

All these cases were, however, afflicted with jaundice, and the leukæmia was so far benign that most of them were able to act as other boys and girls of their age. These two facts are so little suggestive of leukæmia and so eloquent of the presence of acholuric jaundice (a disease not described and recognised until long after Cameron wrote), that one cannot deny their very significant evidence. The blood findings are suggestive of leukæmia in some of the cases only, but Cameron wrote in 1888, when blood analysis was not so exact as it is now. The white cell-counts are not absolute but based on the W.R. ratio. One may suggest that if this was reckoned in a fluid medium, the peculiar fragility of red cells which we now know

to exist in acholuric jaundice may have led to hæmolysis and so upset the W.R. ratio. However, this explanation is more ingenious than satisfactory, and the clinical features alone are sufficient to demonstrate that Cameron's cases had little or nothing in common with leukæmia as recognised to-day.

There is then no evidence that leukæmic mothers tend to have leukæmic children, nor that leukæmic children have leukæmic mothers. These facts, as far as they go, do not entitle us to argue that leukæmia is never an infective disease, but merely that there are cases of leukæmia in which the infective agent, if there be one, very patently refuses to conform to the practices of other infective agents with which we are familiar. If we can look at other aspects of the disease and still find this refusal to conform to the rules which seem to govern the practices of other infective agents, we shall at least have cleared the air of vague surmises and be in a position to give reasons for whatever decision we may come to.

We will next take a definite habit of infective agents and see if the hypothetical infective agent of leukæmia exhibits it or not. This habit is that of transference from person to person, *i. e.* an infective disease is almost always more or less infectious or contagious, directly or through some living or lifeless medium.

INFECTIOUS LEUKÆMIA.

There are in this series two or three instances in which the question of infection of one member of a household by another came naturally to the front.

The two cases of Obrastzow (14) are classical. A boy, aged 17 years, had typical acute leukæmia lasting only two weeks. The type was myeloid, there were many myelocytes in the blood, and the spleen and lymph glands were enlarged. There were also fever, epistaxis, and diphtheria-like exudation on the palate.

He was nursed by a male nurse who, six weeks after the patient's death, developed fever and a similar inflammation of the palate. Later he had purpura, albuminuria, enormous enlargement of the spleen, and myelocytes in the blood. The submaxillary glands were enlarged.

In the first case the W.R. ratio was 1 : 7, in the second 1 : 9.

This may be merely an example of coincidence, but it is noteworthy that the clinical and pathological type was the same in the two cases.

Bie (1) reports somewhat similar cases. Briefly, the father of a

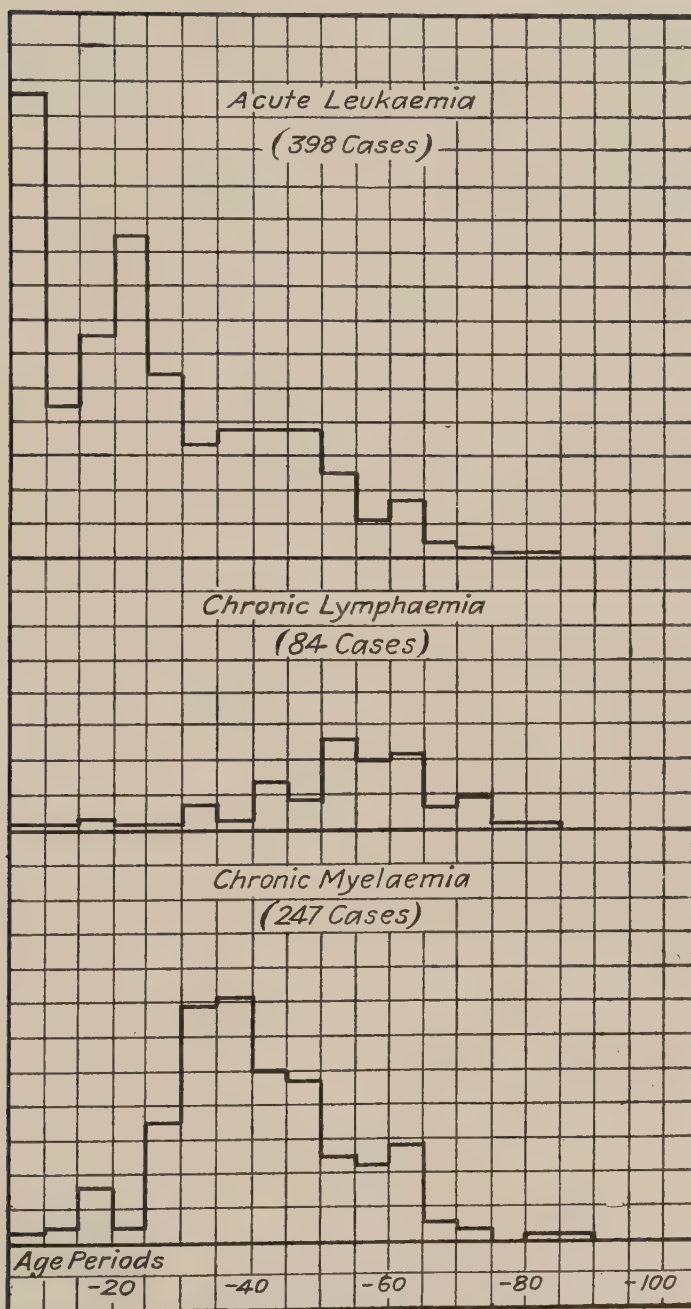


FIG. 1.—The age incidence of the three varieties of leukaemia arranged in five-yearly periods.

household fell sick with chronic myelæmia in 1897 and died in August, 1899. Not long before his death, *i. e.* in June, 1899, a maid in the house fell ill with the same disease.

Again, there is the possibility of mere coincidence, but we also note that the type was the same.

Bearing on the question of infection, Dock (6) has a most interesting observation. A married woman, aged 42 years, suffered from myelæmia for more than three and a half years and eventually died. The diagnosis was fully established. After the mother's death her daughter "had lymphoid hyperplasia in the pharynx and tongue and in the appendix. . . . The latter was removed . . . and found to be free from evidence of inflammation but with lymphoid tissue unusually developed." The husband developed "splenic anæmia" one year after his wife's death.

Here a mother suffered from undoubted myelæmia. After her death her daughter developed a condition which is not uncommonly found in leukæmia but very rarely if at all in any other condition. (In this series of cases lymphoid hyperplasia of the pharynx is reported by a very large number of writers, of the tongue by Warthin (28), Waterhouse (29), von Decastello (5), Treadgold (27), Schültze (19), Reichmann (17), Ponfick (16), etc.; and of the appendix by Gulland and Goodall (7), Lehdorff (10), Moritz (13), Butterfield (2), Stewart (24), Warthin (28), etc.) One might regard the daughter as having a "forme fruste" of leukæmia, while it is perhaps possible that the father's disease was an aleukæmic leukæmia rather than the early stage of Banti's disease. One hesitates, however, to question the undoubted authority of Dock on this subject. (Cases of "aleukæmic leukæmia" are reported by Waterhouse (20), Wende (30), Scott (20), Homer Smith (22), Steinhaus (23), Sweitzer (26), etc.)

The cases of Obrastzow and Dock seem to the writer to be extremely suggestive. It is true they are few, while cases of leukæmia are many. But would a known infective disease such as actinomycosis come out any better from a similar inquiry? Probably not. Yet the occurrence of a true congenital leukæmia comes near to spoiling this parallel, for we cannot well conceive of a congenital actinomycosis in which neither parent was infected.

The only way out of the difficulty is to suppose that there are two or more possible causes of leukæmia, one non-infective and others perhaps infective. This, of course, is not at all impossible. We have a parallel in the case of cholæmia or acholuric jaundice, in which disease the congenital and familial cases very closely resemble in

clinical features frankly infective acquired cases, the latter as a rule due to syphilis.

We have not yet referred to any familial cases of leukaemia, but there is in this series a possible example of this. Jewett (4) had under his care a girl, aged 7 months, suffering from acute myelæmia, who died after three months' illness. There was no autopsy. The spleen, cervical and axillary glands were enlarged. There was

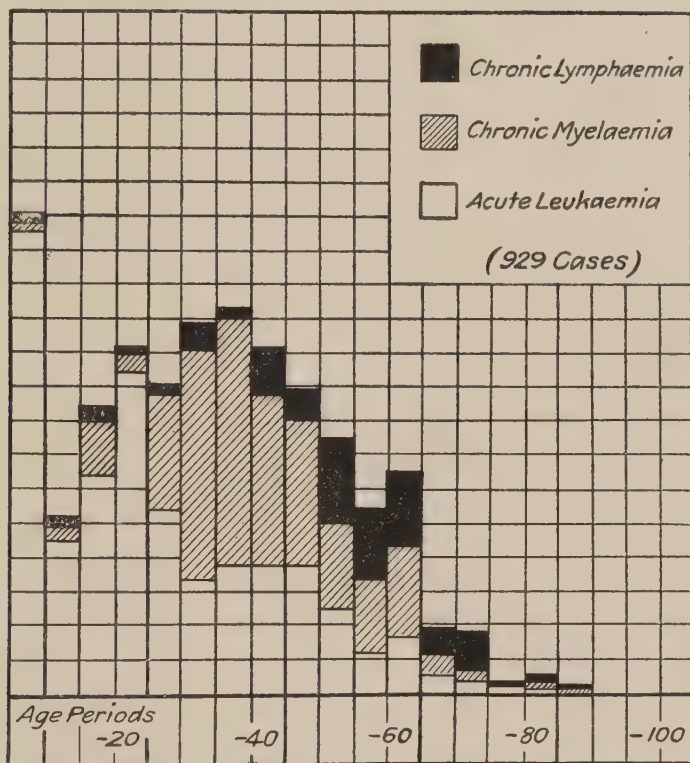


FIG. 2.—Age incidence (in five-year periods) of all varieties of leukaemia subdivided to show the proportion of each variety at each age. Note especially the sharp fall after 60 and the relatively small number of cases in the second age period—years, 6-10.

wasting and diarrhoea, but no bleeding. The blood showed: Red cells, 1,150,000; hæmoglobin, 20 per cent.; nucleated red cells, 5000 per cm.: and white cells, 33,000. Of these last, polymorphs were 1·8 per cent.; “monomorphs,” 78·6 per cent.; and myelocytes, 1·4 per cent.

Jewett then states: “It seems highly probable from the history that a brother and a sister of this child also died of leukaemia. The

eldest brother at the age of 5 months developed enlargement of the abdomen and great anæmia. He died six months later. The sister at 4 months developed marked anæmia, splenic tumour, and emaciation. She died at 8 months. Mother and father alive and well."

The writer has thought well to deal with this case because it is reported as leukæmia. It is, however, suspicious on the face of it. Leukæmia at so early an age very rarely, if ever, manifests itself first by a splenic tumour, but rather by swollen glands, purpura, etc. These were probably cases of Gaucher's disease, nor is the blood condition incompatible with this diagnosis, for, in a case of this disease verified at autopsy and reported by Mason Knox, Wahl, and Schmeisser (10), the blood examination on one occasion showed 35,000 white cells, of which 96 per cent. were mononuclears of one sort or another, only 3 per cent. were polymorphs, and 1 per cent. were "unclassified." Both in this patient, who was 9 months old, and in a sister of 5 months the white cell-count was highly abnormal.

There is one further instance in this series which must also be recorded, although the data are very few. Campbell (4) reported in a discussion at the Royal Academy of Medicine of Ireland that he knew of a woman under treatment for leukæmia whose white cells fell from 400,000 to 5000 after five months' treatment, and adds: "Her child was under treatment for leukæmia at the same time." There are no further details.

Hanczel (8) reports acute leukæmia in a boy whose uncle was also suffering from the disease. The diagnosis appears to have been quite satisfactorily established, but there is nothing to indicate that it was more than a coincidence.

We have, then, arrived at this conclusion—that there is no evidence whatever that congenital acute leukæmia is infective—in fact, all the evidence is the other way. On the other hand, there is some evidence in favour of very occasional infection of one person by another in the case of the disease as seen in older children and adults, and in the case of both acute and chronic forms of leukæmia. Let us grant for the moment that congenital leukæmia is in some way essentially different from other forms and concentrate our attention on the latter. This paper is purposely avoiding bacteriology, etc., in favour of less frequented by-ways. We will pass now to a consideration of the age and sex incidence of leukæmia.

It may be asked what this can possibly have to do with the

question of the infective nature of acute leukæmia. It seems to the writer quite worthy of consideration and for the following reasons. The acute and chronic infections as well as protozoal infections have never been noted to have an evident bias towards one sex, nor is there a very marked difference in their clinical manifestations tallying with the age at which they occur. On the other hand certain metabolic diseases, *e. g.* exophthalmic goitre, diabetes, etc., and generally the diseases which are classed as neoplasms seem invariably to manifest themselves with unusual virulence in the young, and, in adults, are often particularly partial to one sex. These are admittedly wide generalisations, and, especially in the case of infective diseases, may be upset by social conditions which alter statistics although they do not really have an influence on the essential nature and affinities of the disease. Nevertheless they seem to the writer to be valid within wide limits and, moreover, sufficiently valid to make the approximation of leukæmia to one or the other type good evidence of its nature.

AGE AND SEX INCIDENCE.

There can be no doubt whatever as to the type to which leukæmia belongs—it is sufficient to produce evidence that leukæmia has a very marked preference for the male sex, and that each of its three forms (acute leukæmia, chronic myelæmia, and chronic lymphæmia) has a well-marked “age of election.” The accompanying figures show this very well.

Fig. 1 shows the incidence in each five years' period of 398 cases of acute leukæmia, of 84 cases of chronic lymphæmia, and of 247 cases of chronic myelæmia. The latter shows the majority of cases between 25 and 45. Chronic lymphæmia occurs later, and shows the majority of cases between 45 and 60. Acute leukæmia, on the other hand, shows a decided preference for ages below 25, and in this period shows a maximum incidence in the first five years, falling steeply in the next five, but rising to a second maximum between 15 and 20. Is there any class of disease known to be due to an animal or vegetable parasite which varies in any similar manner?

Fig. 2 shows the ages in 929 cases.

Fig. 3 shows the sex incidence of each form. Sixty-five per cent. of all cases are males, *i. e.* two-thirds. But the different forms show slight variations at all ages. Thus acute leukæmia keeps nearest to the average. Its curve is especially valid for the earlier ages, since it is at these that the majority of cases occur. It shows a relative

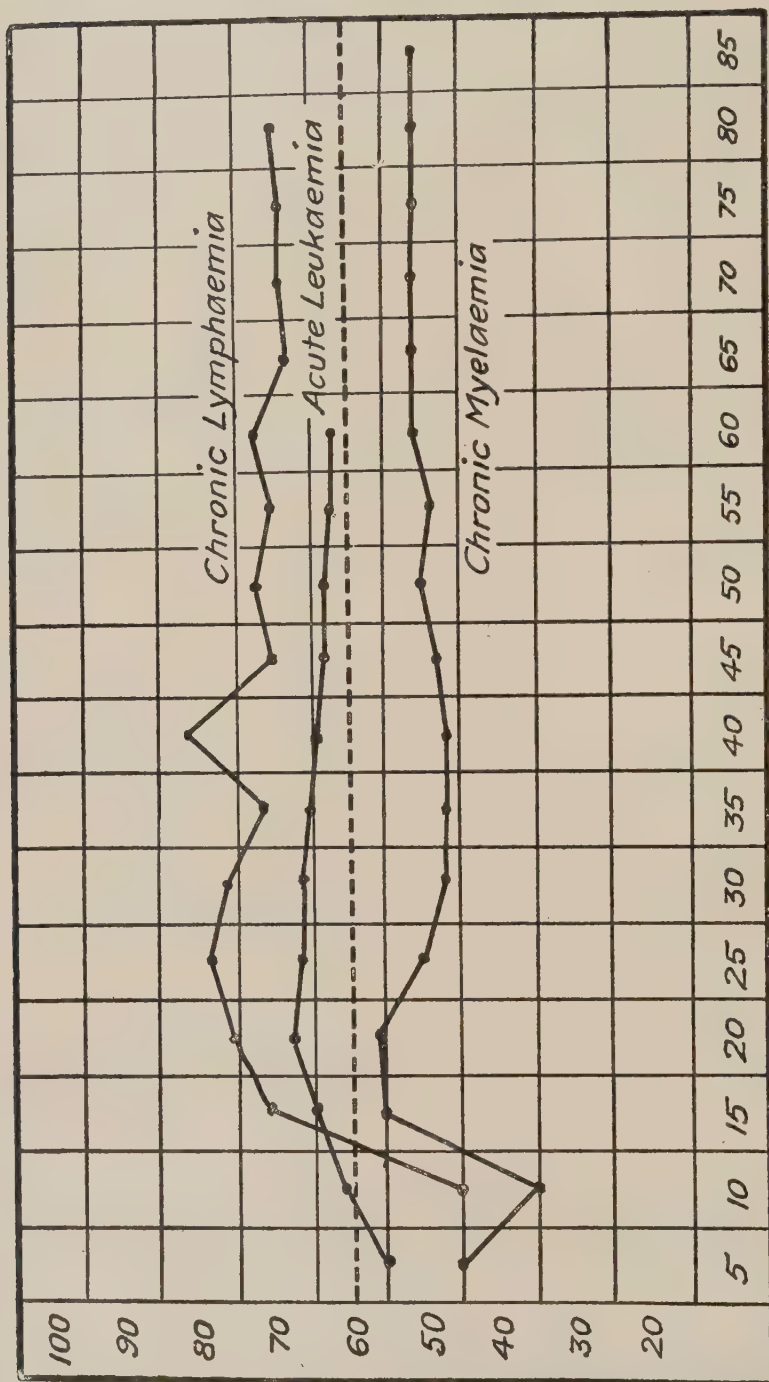


FIG. 3.—Proportions of males at each age period.

preference for females in the first few years which has often been noted clinically, although much smaller numbers were in question.

Chronic lymphæmia shows as much as 80 per cent. of males at all ages up to 20, 25, and 30, and nowhere falls below 73 per cent. Chronic myelæmia shows just as decided a preference for females, and up to some ages reaches 48 per cent. instead of the average 36 per cent. A table is also appended showing the figures on which Fig. 3 is based. It should be borne in mind that the figures at each age are of all cases up to that age and not of those at that age

TABLE I, *showing Proportion of Sexes at various Age Periods.*

All ages to age of	Acute leukæmia.		Chronic lymphæmia.		Chronic myelæmia.	
	M.	F.	M.	F.	M.	F.
5	60	40	—	—	—	—
10	65	35	—	—	—	—
15	69	31	75	25	60	40
20	72	28	80	20	61	39
25	71	29	83	17	55	45
30	71	29	81	19	52	48
35	70	30	76	24	52	48
40	69	31	86	14	52	48
45	68	32	75	25	53	47
50	68	32	77	23	55	45
55	67	33	75	25	54	46
60	67	33	77	23	56	44
65	—	—	73	27	56	44
70	—	—	74	26	56	44
75	—	—	74	26	56	44
80	—	—	75	25	56	44
85	—	—	—	—	56	44

alone. It would require an enormous number of cases to construct a chart in any other way.

We may then recapitulate as follows. The evidence of the facts here dealt with is almost entirely against the infective nature of leukæmia, the established facts being:

- (1) That there is a congenital form of leukæmia which occurs in children whose parents are not leukæmic.
- (2) That leukæmic parents have never been known to transmit the disease to the new-born child.
- (3) That instances in which actual infection of one person by another might seem to have occurred are very few, although not necessarily devoid of significance.

- (4) That in having a marked preference for a particular sex and age leukæmia differs from the infective class of diseases, and resembles the metabolic diseases and cancers.

This is as far as this limited essay purposes to go, but it may well be asked whether leukæmia approximates most to the metabolic or to the malignant diseases. In answer to this one may point out that leukæmia differs from all malignant diseases in that the tissues never show any cellular reaction to the growths of leukæmia, nor do these latter ever destroy neighbouring tissues except by pressure. In this very important feature leukæmia resembles benign new growths such as lipomata or goitre, and these again are not very far removed from what are here called metabolic diseases.

REFERENCES.

- (1) BIE.—'Ugeskrift for Læger,' 1910, lxxii, p. 1607.
- (2) BUTTERFIELD.—'The Physician and Surgeon,' 1907, xxix, p. 49.
- (3) CAMERON.—'Amer. Journ. Med. Sci.,' 1888, xcv, p. 28.
- (4) CAMPBELL.—'Lancet,' 1912, i, p. 1473.
- (5) VON DECASTELLO.—'Semaine Méd.,' 1914, xxiv, p. 144.
- (6) DOCK.—'Amer. Journ. Med. Sci.,' 1904, cxxvii, p. 563.
- (7) GULLARD and GOODALL.—'Journ. Path. and Bact.,' 1905, x, p. 125.
- (8) HANCZEL.—'Wien. klin. Woch.,' 1908, xxi, p. 594.
- (9) JEWETT.—'Philadelphia Med. Journ.,' 1901, vii, p. 816.
- (10) KNOX, WAHL and SCHMEISSER.—'Bull. Johns Hopkins Hosp.,' 1916, xxvii, p. 1.
- (11) LEHNDORF.—'Wien. klin. Woch.,' 1906, xix, p. 110.
- (12) LOMMELL.—'Münch. Med. Woch.,' 1905, lii, p. 904.
- (13) MORITZ.—'St. Petersburg. Med. Woch.,' 1906, xxxi, p. 419.
- (14) OBRASTOW.—'Deutsch. Med. Woch.,' 1890, xvi, p. 1150.
- (15) POLLMANN.—'Münch. Med. Woch.,' 1898, xlv, p. 44.
- (16) PONFICK.—'Virchow's Archiv,' 1876, lxvii, p. 367.
- (17) REICHMANN.—'Münch. Med. Woch.,' 1910, lvii, p. 2002.
- (18) SÄNGER.—'Arch. f. Gynæk.,' 1888-9, xxxiii, p. 204.
- (19) SCHÜTZE.—'Med. Klinik,' 1905, i, p. 258.
- (20) SCOTT.—'Lancet,' 1907, ii, p. 1527.
- (21) SIEFART.—'Monatschr. f. Geburtsh. u. Gyn.,' 1898, viii, p. 215.
- (22) SMITH, H.—'New York State Journ. Med.,' 1910, x, p. 64.
- (23) STEINHAM'S.—'Journ. Méd. de Bruxelles,' 1912, xvii, supp. p. 85.
- (24) STEWART.—'Amer. Journ. Med. Sci.,' 1901, cxxii, p. 576.
- (25) STUHL.—'Deut. Med. Woch.,' 1906, xxxii, p. 248.
- (26) SWEITZER.—'Journ. Amer. Med. Assoc.,' 1916, lxvii, p. 1511.
- (27) TREADGOLD.—'Quart. Journ. Med.,' 1908, i, p. 239.
- (28) WAITKIN.—'Trans. Ass. Amer. Phys.,' 1904, xix, p. 421.
- (29) WATERHOUSE.—'Lancet,' 1908, ii, p. 869.
- (30) WENDE.—'Amer. Journ. Med. Sci.,' 1901, cxxii, p. 836.
- (31) ZUCCOLA.—'Pediatria,' 1904, xxii, p. 371.

ISOLATED NASAL DIPHTHERIA.

By J. D. ROLLESTON, M.D.

HISTORICAL NOTE.

BRETONNEAU, though he maintained that diphtheria always originated in the nostrils, did not recognise an isolated nasal form of the disease. Isambert (18) in 1857 reported two cases under the name of "coryza couenneux" in which the membrane was confined to the nostrils and persisted there for a very long time, but it was Jenner (19) in 1861, who was the first to describe a nasal form of diphtheria, characterised by a sanious discharge from the nose and enlargement of the glands about the angles of the jaw.

The following description shows that this justly celebrated British clinician is entitled to the priority which is so often attributed to foreign observers: "After a few days the disease subsides, and you remain in doubt as to its nature; or it spreads to the larynx, and the diagnosis becomes easy . . . or some other member of the family or an attendant sickens with unmistakable symptoms of diphtheria . . . or again when the exudation reaches the pharynx, the pharyngeal symptoms may be most distressing and lead to inspection of the part and detection of the disease." It was thus evident that Jenner recognised that the disease might remain localised in the nose or spread to the larynx or pharynx.

In 1869 Orr and Gairdner (25) reported two fatal cases of hyper-toxic nasal diphtheria in young children in whom the throat was not affected.

In 1870 Fournié (10) recorded five cases of pseudo-membranous pharyngitis in which the membrane did not extend beyond the soft palate.

In 1871 Schuller (36), who by many writers is erroneously accredited with being the first to describe nasal diphtheria, gave a short account of a case of "primary croup of the nasal mucosa" in which death was due to extension of the membrane to the pharynx, and erysipelas.

Of other writers of the pre-bacteriological era Sanné and Henoch may be mentioned. In his monograph on diphtheria (34) Sanné says that it is rare for diphtheria to remain localised in the nasal fossæ, and he elsewhere (35) gives an account of three cases of nasal diphtheria in the same family. The child died without any manifestations in the pharynx or larynx. The mother had a nasal discharge

of moderate intensity and recovered. The father's attack was very mild. Henoch (17) stated that he had only once seen an independent rhinitis pseudomembranacea, and was uncertain whether to regard it as a case of true diphtheria confined to the nasal cavities or as a non-specific croupous rhinitis.

Concetti (6) in 1892 was the first writer after the discovery of the diphtheria bacillus to give a full description of primary nasal diphtheria, based on the study of five cases. The nature of the disease was established in two of his cases by the culture of virulent diphtheria bacilli, in two by spread of infection, and in one by the supervention of characteristic diphtheritic paralysis. The course of the disease in all these cases was a chronic one, and with one exception the process was confined to the nose. Its benignity was attributed by Concetti to the fact that the nasal mucosa was little, if at all, capable of absorption. He pointed out, however, that in spite of its mild character the disease might be very dangerous, as it might cause malignant faucial or laryngeal diphtheria in the patient himself or in other individuals.

Concetti's findings were corroborated the same year in Baginsky's clinique by Stamm (38), who reported three cases of pseudo-membranous rhinitis, in all of which virulent diphtheria bacilli were found. He came to the conclusion that the diphtheria bacillus was the cause of the disease hitherto described as pseudo-membranous or fibrinous rhinitis, and that it was no longer justifiable to separate fibrinous rhinitis from nasal diphtheria, with the possible exception of the few cases which occurred after cauterisation as described by Maggiora and Gradenigo. Both diseases he maintained should be united from the ætiological standpoint, while according to the course of the disease an acute and chronic form of nasal diphtheria should be distinguished.

It was about this time that a discussion first began as to the relationship between diphtheria and fibrinous rhinitis, a discussion which even yet has not been finally settled. The earlier writers, *e. g.* Hartmann (16) (1887), Seifert (37) (1887), Bischofswerder (4) (1889), Potter (27) (1889), and Raulin (30) (1890) declared that there was no relation between the two, on the ground that nasal diphtheria was an acute severe disease with a tendency to involve the pharynx and larynx and was accompanied by much constitutional disturbance, a high mortality, and characteristic paralysis, whereas fibrinous rhinitis was a mild disease running a chronic course without any disturbance of the general condition or complications of any kind. They regarded the diphtheria bacilli found by other observers in cases of fibrinous

rhinitis as harmless saprophytes without any pathological significance.

With the progress of bacteriology arose an increasing tendency to annul this distinction between fibrinous rhinitis and nasal diphtheria. In 1894 Gerber and Podack (12) published an important paper in which they pointed out that what had been regarded as clinical distinctions between the two conditions did not hold good. In the first place the mild character of fibrinous rhinitis was not invariable, while on the other hand there were numerous cases of diphtheria which ran a mild course with very slight disturbance of the general condition. Secondly, the course of fibrinous rhinitis was not always chronic or subacute, but might be quite acute and end in one or two weeks. On the other hand, cases of faucial diphtheria lasting for several weeks had been reported by many writers, notably by Cadet de Gassicourt. Thirdly, they drew attention to the occurrence of fibrinous rhinitis during a diphtheria epidemic, and to the subsequent development of diphtheria of the fauces or larynx in a patient suffering from fibrinous rhinitis, as well as to the outbreak of undoubted diphtheria in the immediate neighbourhood of such a patient. They concluded that the so-called fibrinous rhinitis was, in many cases, perhaps in most, of a true diphtheritic nature, and that in practice every case of fibrinous rhinitis, as long as its non-diphtheritic nature had not been proved, should be regarded as true diphtheria.

Ravenel (29) in 1895 reported twelve cases of membranous rhinitis, some of which had been followed by other examples of fibrinous rhinitis or of faucial diphtheria in the same family. He was of opinion that the majority of cases of membranous rhinitis were really forms of nasal diphtheria and should be regarded as such until the contrary had been proved by cultural methods.

Pluder (26) in 1896 reported six cases in which fibrinous rhinitis was associated with faucial diphtheria in the same patient or in persons in his immediate neighbourhood. He held that there were no features peculiar to fibrinous rhinitis to distinguish it from diphtheria.

With the exception of certain English rhinologists, subsequent writers, *e. g.* Glatard (14) (1902), Vieillard (43) (1902), Massei (24) (1904), Wolff (44) (1905), Faseuille (8) (1906), Stimson (40) (1907), Friesner (11) (1907), Ker (20) (1909), Graham (15) (1910), Biehler and Korybut-Daskiewicz (3) (1911), Cartaz (5) (1912), Bergh (2) (1915), and Marinho (23) (1916) seem to ignore the distinction between fibrinous rhinitis and diphtheria and either discard the use

of the term fibrinous rhinitis altogether or reserve it for those comparatively rare cases due to other aetiological factors than the diphtheria bacillus, *e. g.* staphylococcus (Maggiore and Gradenigo (22), Price-Brown (28)), streptococcus and pneumococcus (Abel (1)). All these writers are agreed as to the epidemiological importance of isolated nasal diphtheria and the necessity of treating it by antitoxin.

The question seems to have attracted little attention in this country until 1898, when Lambert Lack read a paper before the Royal Medical and Chirurgical Society of London, entitled "Fibrinous or Membranous Rhinitis and its Relation to Diphtheria," based on clinical and bacteriological examination of thirty-six cases. While establishing the diphtheritic nature of fibrinous rhinitis he accentuated the distinction from diphtheria, especially as regards the very slight amount or complete absence of general symptoms, entire absence of sequelæ, absolutely good prognosis, and relative chronicity. He was unable to find any example among his cases where the disease had given rise to a single case of unmistakable diphtheria, and regarded recorded instances as doubtful. Other English rhinologists, especially StClair Thomson (41), Tilley (42), and Yonge (45) have adopted Lack's views. StClair Thomson, indeed, is so convinced of the clinical distinction of fibrinous rhinitis from diphtheria as to declare that the injection of diphtheria antitoxin does no good. On the other hand, Duncan Forbes and Newsholme (9) (1912), while still retaining the term membranous rhinitis, point out from their experience of school outbreaks that it possesses great infectivity, and are of opinion that its frequency is not sufficiently recognised.

The present paper is based on the occurrence of isolated nasal diphtheria among 3000 cases of diphtheria which were under my care at the Grove Hospital between 1902 and 1915. Of these only 55 cases or 1·5 per cent. were examples of isolated nasal diphtheria, *i. e.* diphtheria starting in the nose and remaining confined to that site, as compared with 620 cases or 20·6 per cent. in which nasal diphtheria was associated with diphtheritic angina. The diagnosis in each case was confirmed by bacteriological examination.

With the exception of four infants who were suffering from congenital syphilis, all the patients had been in good health until the time of their attack of diphtheria. None had been recently suffering from scarlet fever or measles which so frequently precede nasal diphtheria.

Age and sex.—With the exception of two patients, aged 26 and 51 years respectively, the disease was confined to children aged

from five weeks to sixteen years. As I have shown elsewhere, isolated nasal diphtheria is relatively frequent in the first year of life. The sexes were almost equally divided. The exact figures are given in the annexed table.

TABLE I.

Years.	Males.	Females.
0- 1 . . .	3 . . .	3
1- 2 . . .	1 . . .	2
2- 3 . . .	4 . . .	3
3- 4 . . .	2 . . .	5
4- 5 . . .	3 . . .	1
5- 6 . . .	0 . . .	2
6- 7 . . .	3 . . .	3
7- 8 . . .	8 . . .	1
8- 9 . . .	1 . . .	0
9-10 . . .	1 . . .	2
10-11 . . .	0 . . .	1
11-12 . . .	1 . . .	1
12-13 . . .	0 . . .	1
16-17 . . .	0 . . .	1
26-27 . . .	0 . . .	1
51-52 . . .	0 . . .	1
	27	28

Season.—Table II shows the preponderance of cases in the cold months of the year.

January-March . . .	14 cases
April-June . . .	7 „
July-September . . .	2 „
October-December . . .	32 „
	55

Symptomatology.—The commonest prodromal symptoms were headache (16 cases), sore throat (14 cases), shivering (8 cases), and vomiting (8 cases). Twenty had no symptoms beyond a discharge from the nose, but this absence of complaint may have been partly due to the fact that a large proportion of the patients were very young children.

The local symptoms varied. The character of the nasal discharge was watery (16 cases), sanious (11 cases), or purulent (9 cases). In

five there were only dry crusts present. Membrane could be seen in the nostrils without the aid of a speculum in 15 cases.

Redness and excoriation of the ala nasi, septum and naso-labial groove on the side corresponding to the discharge was frequently observed. Enlargement of the submaxillary or cervical glands was frequently but not invariably present. As regards the general condition, in 11 cases the temperature was normal or subnormal on admission, and remained so throughout their stay in hospital. In 44 there was some pyrexia on admission, ranging from 98.6° F. to 104.4° F., and lasting from one to four days or more. None, however, appeared to be severely ill with the exception of the four subjects of congenital syphilis. This absence of general disturbance and slightness of the local signs explain why barely half the cases were admitted to hospital until they had been ill over a week. The exact duration of their illness on admission is shown in Table III.

Date of disease on admission.

1st week	.	.	.	.	28 cases
2nd „	.	.	.	.	17 „
3rd „	.	.	.	.	4 „
4th „	.	.	.	.	1 „
5th „	.	.	.	.	2 „
6th „	.	.	.	.	1 „
3 months	.	.	.	.	1 „
?	.	.	.	.	1 „

Infectivity.—In 16 cases one or more other members of the family had simultaneous attacks of faucial or nasal diphtheria. Excluding from consideration 14 cases which were lost sight of, as they were transferred to a convalescent hospital shortly after they were allowed to leave their bed, the long duration of infectivity is shown by the fact that 26 of the remaining 41 patients were detained more than six weeks, for periods ranging from 45 to 132 days, owing to the persistence of diphtheria bacilli in the nostrils.

Complications.—Albuminuria lasting from 1 to 18 days was the commonest complication, having been noted in 13 cases; otitis occurred in 2, paralysis (cycloplegia) in 1. Two had a relapse, one a mild nasal attack, and the other very severe faucial diphtheria which proved fatal in a few days.

Prognosis.—The present series confirms the rule as to the general

benignity of isolated nasal diphtheria. All recovered except three infants, aged 5 weeks, 10 weeks, and 3 months respectively, all subjects of congenital syphilis. In two death was due to bronchopneumonia, and in the third to an attack of very severe faucial diphtheria which supervened nearly four months after admission.

Treatment.—With the exception of 3 cases which received no antitoxin, all were given doses ranging from 1000 to 12,000 units. Nineteen of these subsequently developed urticarial rashes, but no other sequelæ attributable to the serum were observed. Owing to the risk of infecting the middle ear nasal irrigation was avoided, and no local treatment was employed in any case beyond keeping the nose clean. Care was taken to prevent the child infecting itself elsewhere by picking its nose and scratching other parts of the body.

The local application of a bouillon culture of *Staphylococcus pyogenes aureus*, which I had found useful in removing the bacilli in faucial cases (32), proved ineffective in nasal diphtheria.

REMARKS.

The frequency of isolated nasal diphtheria has been variously estimated by different observers, some regarding it as a rare occurrence, and others as extremely frequent. The difference in these views is partly to be explained by the significance attached by various writers to the term "primary," the more frequent synonym for "isolated" nasal diphtheria, and partly to the fact that their field of observations varied considerably. Cases of isolated nasal diphtheria are comparatively seldom sent to a fever hospital, and this accounts for the fact that the present series forms only so small a fraction of a large number of cases of diphtheria admitted to hospital during a period of thirteen years. Only slightly higher figures are given by Bergh (2) who states that among 256 diphtheria patients treated at the fever hospital at Malmö 9 cases, or 3·5 per cent., had primary nasal diphtheria. It is much more frequent, however, to find cases of nasal diphtheria in a fever hospital among children convalescent from scarlet fever or measles, but it is in schools and among other collections of children that the disease is most frequent. The rarity of the condition in adults and its frequency in children, to which most writers have drawn attention, is well shown in my cases.

The relative frequency with which diphtheria tends to remain localised in the nostrils in infancy, which has been illustrated in a previous paper (33) has been attributed to the fact that in infants

the bucco-pharyngeal cavity is an acid medium ill-suited for the development of diphtheria bacilli.

The association with congenital syphilis, which is well exemplified in the present series, has been noted by other observers, especially Grenet and Lesné, Riether, Ballin, and Hutinel.

The generally mild character of isolated nasal diphtheria has been proved by the interesting experiments of De Stella (39) to be the result of auto-immunisation. In his first experiment he smeared the nasal mucosa of five guinea-pigs and one rabbit with virulent cultures of diphtheria bacilli. Within 12 hours the cultures had all disappeared from their noses. As a control experiment he smeared the same cultures on the pharyngeal, conjunctival, and vaginal mucosæ of three guinea-pigs and one rabbit, with the result that diphtheria developed in all.

His second experiment was the same as the first, except that the cultures were inoculated after scarification of the nasal mucosa. In 15 hours the bacilli had disappeared from the nose and no membrane had developed, whereas in control animals inoculated on the pharyngeal, conjunctival, or vaginal mucosæ a rapidly fatal diphtheria occurred.

The third experiment consisted in inoculation after cauterisation of the mucosa of the nasal septum. In 12 hours there was formation of a membrane which in 48 hours extended over a large surface of the nasal fossæ, and was associated with sneezing and discharge of pus and blood from the nose. Only two of the 50 guinea-pigs thus inoculated died, while none of the rest showed any signs of illness. The fourth experiment consisted in inoculating the animals which had recovered from nasal diphtheria with an extremely virulent bouillon culture of diphtheria bacilli. It was found that they were able to resist doses ten times stronger than that which could be borne by the control animals.

Further, a serum was prepared from the blood of these animals which, when infected into guinea-pigs, rendered them refractory to large doses of diphtheria toxin.

De Stella concluded that in diphtheritic rhinitis the organisms secrete an antitoxin which completely neutralises the diphtheria toxin.

In rare instances, though the membrane is confined to the nose, there is considerable toxæmia. Only one example was met with in the present series, in a congenital syphilitic child. Other cases of toxæmic diphtheria confined to the nose have come under my notice though they are not included in the present series.

The absence or scarcity of complications in isolated nasal diphtheria is in accordance with the slight degree of associated toxæmia. The occasional but rare development of diphtheritic paralysis, one instance of which occurred in the present series, has been noted by Concetti (6), Escat (7), van Gilse (13), and Bergh (2).

The long persistence of the diphtheria bacilli and the inefficacy of attempts to get rid of them are readily explained by anatomical considerations. The numerous folds in the mucous membranes of the nasal fossæ, antrum of Highmore, ethmoid and frontal sinuses form an excellent incubator for the growth and multiplication of the specific bacilli.

As regards diagnosis, diphtheria of the nose should be suspected in the presence of a persistent rhinorrhœa, whether sanious or purulent, especially if unilateral and accompanied by redness and excoriation of the corresponding side of the naso-labial fold and ala nasi.

The diseases most likely to be mistaken for it are a foreign body in the nostril and the rhinitis of congenital syphilis.

As regards the latter, it must be borne in mind that the two diseases not infrequently co-exist; a negative bacteriological examination, especially when no improvement follows the injection of anti-toxin, will settle all doubts.

I reported some years ago (31) an example of intranasal chancre simulating nasal diphtheria in which the diagnosis was made by the co-existence of a polymorphic eruption, the considerable adenopathy, the absence of diphtheria bacilli and the result of antisymphilitic treatment.

SUMMARY.

(1) Isolated nasal diphtheria, *i. e.* diphtheria originating in and confined to the nose, occurred in 95 out of 3000 cases of diphtheria (1.5 per cent.) admitted to hospital.

(2) It is most frequent in young children and in the cold months of the year. Congenital syphilis is a predisposing cause.

(3) The great majority of cases run a mild course, but rare examples of toxæmic diphtheria confined to the nose undoubtedly do occur.

(4) The habitually mild course of isolated nasal diphtheria has been proved to be due to auto-immunisation.

(5) Chronicity is a characteristic feature of isolated nasal diphtheria, the persistence of the bacilli being explained on anatomical grounds.

- (6) Sequelæ occasionally occur, but are rare.
- (7) Treatment by antitoxin is indicated. Local treatment should be avoided.
- (8) The term "fibrinous rhinitis" should be reserved for those comparatively rare cases in which this form of rhinitis is due to other causes than the diphtheria bacillus.
- (9) The practical significance of isolated nasal diphtheria consists in its epidemiological importance.

REFERENCES.

- (1) ABEL.—'Centralbl. f. Bakt.,' 1892, xii, p. 841.
- (2) BERGH.—'Monatsschr. f. Ohrenheilk. u. Laryngo-Rhinol.,' 1915, xlix, p. 584.
- (3) BIEHLER and KORYBUT-DASKIEWICZ.—'Arch. de méd. des enf.,' 1911, xiv, p. 833.
- (4) BISCHOFSWERDER.—'Arch. f. Kinderheilk.,' 1889, x, p. 127.
- (5) CARTAZ.—'Nouveau Traité de Méd. et de Thér., par Brouardel et Gilbert,' 1912, xxviii, p. 79.
- (6) CONCETTI.—'Arch. ital. di laryng.,' 1892, xii, p. 57.
- (7) ESCAT.—'Centralbl. f. Laryng.,' 1911, xxvii, p. 19.
- (8) FASEUILLE.—'Thèses de Paris,' 1905-6, No. 201.
- (9) FORBES and NEWSHOLME.—'Lancet,' 1912, i, p. 292.
- (10) FOURNIÉ.—'Gaz. d. hôp.,' 1870, xliii, p. 315.
- (11) FRIESNER.—'New York Med. Jour.,' 1907, lxxxv, p. 889.
- (12) GERBER and PODACK.—'Deutsch. Arch. f. klin. Med.,' 1895, liv, p. 262.
- (13) GILSE, VAN.—'Centralbl. f. Laryng.,' 1911, xxviii, p. 611.
- (14) GLATAUD.—'Thèses de Paris,' 1901-2, No. 431.
- (15) GRAHAM.—'Arch. of Ped.,' 1910, xxvii, p. 887.
- (16) HARTMANN.—'Deutsch. med. Woch.,' 1887, xiii, p. 641.
- (17) HENOCH.—'Vorlesungen über Kinderkrankheiten,' 1881, p. 286.
- (18) ISAMBERT.—'Arch. gén. de Méd.,' 1857, i, p. 447.
- (19) JENNER.—"Diphtheria, its Symptoms and Treatment," 1861.
- (20) KER.—"Infectious Diseases," 1909.
- (21) LACK.—'Med.-Chir. Trans.,' 1899, lxxxii, p. 1.
- (22) MAGGIORA and GRADENIGO.—'Centralbl. f. Bakt.,' 1890, viii, p. 641.
- (23) MARINHO.—'Brazil-medico,' 1916, xxx, p. 190.
- (24) MASSEI.—'Arch. Ital. di laryng.,' 1904, xxiv, p. 45.
- (25) ORR and GAIRDNER.—'Glasgow Med. Journ.,' 1869, i, p. 395.
- (26) PLUDER.—'Deutsch. Med. Woch.,' 1896, xxii, p. 708.
- (27) POTTER.—'Journ. of Laryng.,' 1889, iii, p. 89.
- (28) PRICE BROWN.—*Ibid.*, 1899, xiv, p. 225.
- (29) RAVENEL.—'Med. News,' 1895, lxvi, p. 537.
- (30) RAULIN.—'Rev. de laryng.,' 1890, x, p. 289.
- (31) ROLLESTON, J. D.—'Lancet,' 1906, i, p. 1682.
- (32) *Id.*—'Brit. Journ. Child. Dis.,' 1913, x, p. 298.
- (33) *Id.*—'Am. Journ. Dis. Child.,' 1916, xii, p. 47.
- (34) SANNÉ.—"Diphthérie," 1877, p. 240.
- (35) *Id.*—'Dictionnaire de Dechambre,' 1884, art. Diphthérie.
- (36) SCHULLER.—'Jahrb. f. Kinderheilk.,' 1871, iv, p. 331.
- (37) SEIFEIT.—'Münch. med. Woch.,' 1887, xxxiv, p. 733.
- (38) STAMM.—'Arch. f. Kinderheilk.,' 1892, xiv, p. 157.

- (39) STELLA.—'Arch. internat. de laryng.,' 1903, xvi, p. 970.
 (40) STIMSON.—'New York Med. Journ.,' 1907, lxxxvi, p. 1123.
 (41) THOMSON, STCLAIR.—"Diseases of Nose and Throat," second edition, 1916, p. 150.
 (42) TILLEY.—"Diseases of Nose and Throat," 1908, p. 43.
 (43) VIEILLARD.—'Thèses de Lyon,' 1902-3, No. 145.
 (44) WOLFF.—'Deutsch. med. Woch.,' 1905, xxxi, p. 65.
 (45) YONGE —"Handbook of Diseases of Nose and Throat," 1909, p. 45.
-

CEREBRAL DIPLEGIA WITH ABNORMAL FLEXIBILITY ("ATONY" OR "HYPOTONIA") OF ANKLE JOINTS.*

By F. PARKES WEBER, M.A., M.D., F.R.C.P.Lond.

THE patient, a boy, C. H—, aged 5½ years, was admitted to hospital on August the 18th, 1916, and was kept under observation till October the 16th. During that time the child's condition changed very little, but he gained slightly in body weight. Though he is doubtless mentally backward, he is certainly not an idiot, and can understand what one tells him to do, but he can speak very little, and that only in a slow, jerky way. His body is fairly well nourished, but his legs are thin and apparently weak, and there is abnormal laxity of the ankle-joints, permitting *extreme* dorsal flexion (*hyperflexion*, or better, *superflexion*, as illustrated in Fig. 3 of the paper by F. E. Batten and W. H. von Wyss, referred to under "Bibliography" at the end). He is very awkward with his upper extremities, and his hands often assume an athetosis-like position. He can, with some difficulty, grasp a piece of cake or anything he wishes to eat, but he can do very little else with his hands except, in an extremely awkward (partly ataxic ?) way, catch hold of things. In spite of the poor-looking development of his feet and legs and the great super-flexibility of his ankle-joints, there is usually no real muscular atony. The muscles of the legs contract well, and he can move his legs freely when lying on his back in bed. He can sit up and hold his head up. When held up by the arms he will endeavour to walk. The knee-jerks are always present, and are sometimes greatly exaggerated. The plantar reflexes are sometimes (but not always) definitely of the extensor type (Babinski's sign). A most striking feature is the "overflow" of the superficial abdominal reflexes; the response is not limited to contraction in the

* Paper read at the Royal Society of Medicine, Section for the Study of Disease in Children, October the 27th, 1916. Slight alterations have been introduced.

muscles of the abdominal wall, but it involves considerable movements of the thighs and trunk.

There can be no doubt that the condition dates from birth. The birth was a difficult one (breech presentation), and I suppose that some widespread symmetrical damage to the cerebrum (and? cerebellum) resulted. Possibly there was diffuse bilateral meningeal hæmorrhage injuring the cerebral cortex. The mother has two other children, who are normal, excepting that one of them has nocturnal enuresis.

In the hospital there was frequently slight evening pyrexia (to 100° F.), and the child has perhaps some tuberculosis of lymphatic glands in the thorax. Dr. James Metcalfe, after examination of a Röntgen skiagram of the thorax, reported that there were many small enlarged hilus glands. There are no signs of rickets whatever. The fundi of the eyes (Dr. R. Gruber) are normal.

I hesitate to classify the case as one of the "Atonic (Hypotonic) Type of Cerebral Diplegia," because there is, I think, no real condition of muscular atony or hypotonia present, at all events, not always present; but certainly in some respects it resembles cases that have been described under that heading, notably in regard to the feeble-looking legs, the super-flexibility of the ankle-joints, and the "overflow" of the superficial abdominal reflexes. With regard to differential diagnosis, the hypotonia of the joints connected with Oppenheim's "Amyotonia (Myatonia) Congenita" has of course to be distinguished. In Finkelstein's case of congenital and familial flail Joints ("Joint Hypotonia") there was no sign of either cerebral diplegia or amyotonia congenita.

BIBLIOGRAPHY.

- BATTEN, F. E., AND VON WYSS, W. H.—"The Atonic Form of Cerebral Diplegia," 'Brit. Journ. Child. Dis.,' Lond., 1915, xii, p. 65.
- CLARK, L. PIERCE.—"Infantile Cerebro-Cerebellar Diplegia of Flaccid Atonic-Astasic Type," 'Amer. Journ. Dis. Child.,' 1913, v, p. 425.
- FEARNSIDES, E. G.—"A Case of the Atonic Form of Cerebral Diplegia," 'Brit. Journ. Child. Dis., Lond.,' 1915, xii, p. 166.
- FINKELSTEIN, H.—"Joint Hypotonia with Congenital and Familial Manifestations," 'New York Med. Journ.,' 1916, civ, p. 942.
- FOERSTER, O.—"Der atonisch-astastische Typus der infantilen Cerebrallähmung," 'Deutsch. Arch. f. klin. Med.,' Leipz., 1910, xcvi, p. 216.

A CASE OF CYCLIC VOMITING WITH ACETONÆMIA
(ACIDOSIS). REMARKS ON NON-DIABETIC ACETO-
NURIA AND DIACETURIA.*

By F. PARKES WEBER, M.A., M.D., F.R.C.P.Lond.

THE patient, P. H—, is a girl, aged 7 years, physically well-developed and of fairly good "general nutrition," but considered to be somewhat mentally backward and dull. She was born in Manchester, of Hebrew parents from Hungary. She is said to have vomited at birth, and from birth onwards to have had recurring attacks of vomiting, with intervals averaging five weeks between the attacks, each attack generally lasting about three or four days. She has three sisters and four brothers, but in none of them has any similar affection been observed.

An attack, apparently at first of the ordinary kind, commenced on June the 11th, but did not pass off as soon as usual. From June the 12th vomiting recurred at short intervals (more or less incessantly, I was told) till the patient was admitted to hospital, on July the 3rd; she was said to be losing weight and had complained of a feeling of giddiness.

On admission the child was abnormally inclined to sleep. The temperature was 98° F.; the pulse was 92, and the respiration 24 per minute. Nothing abnormal was found by examination of the thorax, abdomen, throat, and ears. The urine (July the 3rd) was of specific gravity 1030; acid in reaction; free from albumin; very slightly reducing Fehling's solution (though this was probably not due to the presence of sugar); giving a positive Gerhardt's (perchloride of iron) reaction for diacetic acid and a positive Legal's (nitroprusside) reaction for acetone. The knee-jerks were rather exaggerated; there was no ankle clonus; the plantar reflexes were of the (normal) flexor type; the abdominal reflexes were present; the pupils reacted well to light. Nothing abnormal was discovered by ophthalmoscopic examination (Dr. R. Gruber). There was no cervical rigidity and there was no evidence of meningism.

Under treatment by sodium bicarbonate the urine soon became alkaline and turbid with phosphates, but the reaction for diacetic acid was not found to be negative till July the 7th, nor that for acetone till July the 8th. The reaction with Fehling's solution had never again been found to be at all positive. There was no

* A paper read at the Royal Society of Medicine, Section for the Study of Disease in Children, December the 15th, 1916.

vomiting after July the 4th : on July the 6th the child was sitting up in bed, looking quite happy and well again, and on July the 13th she was taken to her own home.

She was, however, readmitted to hospital on August the 6th, in a somewhat drowsy state, as on the last occasion ; temperature, 97° F. ; pulse, 96 ; respiration, 24 per minute. The attack was stated to have commenced on August the 4th with lassitude and sleepiness, vomiting having first occurred at 5 a.m. on August the 6th (about five hours before admission). At 11 a.m. (that is to say, about six hours after the commencement of the vomiting) the urine was found to give a negative Gerhardt's reaction for diacetic acid ; Legal's reaction for acetone was likewise negative, but Rothera's reaction for acetone was faintly positive. In the afternoon, treatment by sodium bicarbonate was commenced. In the evening the urine (weakly acid, of specific gravity 1026, and free from albumin and sugar) gave positive Gerhardt's and Legal's reactions.

On August the 7th the urine was slightly alkaline and turbid with phosphates, but gave positive reactions for acetone (Legal's) and diacetic acid (Gerhardt's). There was no vomiting after August the 6th, and on the afternoon of August the 7th the child seemed happy and quite well again. But in spite of the urine being neutral or slightly alkaline (and turbid with phosphates) Gerhardt's and Legal's reactions were both positive on August the 8th. On the morning of the following day, however, Gerhardt's reaction was negative, Legal's reaction being still positive. In the evening (August the 9th) both reactions were negative, and so they remained on August the 10th and afterwards. On August the 12th the child was discharged to her own home. It may be mentioned that a few small purpuric spots (petechiæ) were observed, scattered over the trunk and limbs, on readmission (August the 6th), but these had practically disappeared by August the 9th, and no fresh ones had appeared. I was not quite satisfied that they were not due to insects. On August the 12th, just before the child left the hospital, a blood-count gave : Red cells, 5,000,000, and white cells, 7925 (55 per cent. of which were polymorphonuclear neutrophiles), to the cubic millimetre of blood ; hæmoglobin, 90 per cent.

The attack in August was obviously much less severe than that in June. On November the 22nd I heard that the patient since leaving the hospital had had two of her ordinary attacks, each lasting about three days, one in September and the other in October. The specimens of urine passed on November the 22nd and November the 25th (out-patient department) were of specific gravity 1016 to 1017, acid,

free from albumin and sugar, and giving negative reactions for acetone and diacetic acid.

For help in the examination of this case I am much indebted to Dr. H. Schmidt, the Resident Medical Officer.

REMARKS.

It should be noted that in this child in both attacks the vomiting was preceded by a day or two of prodromal symptoms (lassitude and somnolence). The ordinary reactions for acetone and diacetic acid became positive in the urine after the commencement of the vomiting and persisted, in spite of the urine being rendered neutral or slightly alkaline by the administration of sodium bicarbonate, till a day or two after the child seemed well again; the reaction for acetone made its appearance slightly before diacetic acid could be detected, and it remained weakly positive for a day or so after the reaction for diacetic acid had been found negative.

Quite apart from the acidosis which has been said to sometimes result from the prolonged therapeutic use of large doses of sodium salicylate,* acetonuria and diaceturia are not very rarely present in diseases (*e.g.*, acute follicular tonsillitis, with suspicion of rheumatic fever) for which salicylates may be given. In this connection, therefore, I should like to draw attention to the frequent statement that the colour-reaction produced by adding perchloride of iron solution to a urine containing salicylate can be at once distinguished from that due to the presence only of diacetic acid (Gerhardt's reaction), that the colour produced in the former case is a bluish-purple, reminding one of the colour of certain grapes and plums and of some kinds of claret, whilst the true colour in the latter case (Gerhardt's reaction for diacetic acid) is the golden-red, or brownish-red, of slightly tawny port-wine, and (amongst gemstones) of some garnets. These statements are, however, only partly true, for, though, I believe, the bluish-purple colour-reaction, characteristic of salicyluric specimens of urine, is never caused by the presence merely of diacetic acid, nevertheless, the typical tawny port-wine colour-reaction, sometimes stated to be a certain sign of the presence of diacetic acid, can *always* be obtained with the urine of persons under salicylate treatment. In fact, with a salicyluric specimen of urine it depends on the relative quantities of the reagent (perchloride of iron) and of the salicylic contents of the urine whether the tawny port-wine colour

* Cf. F. Langmead's remarks ('Lancet,' 1913, ii, p. 1755) on the danger of acid intoxication during treatment by large doses of sodium salicylate.

or the more usual bluish-purple colour is produced.* A positive Legal's or Rothera's reaction for acetone is of course very valuable when Gerhardt's (perchloride of iron) reaction for diacetic acid is interfered with by some salicylic compound having been employed in the treatment of the case.

Cyclic or periodic vomiting in children, of which the present case (P.H.) is an example, was described by Samuel Gee in the first important paper on the subject, in 1882, under the heading, "Fitful or Recurrent Vomiting."† Many years later various interesting studies of the condition were published in America and France by J. P. Crozer Griffith,‡ Edsall,§ Marfan,|| and others. Excellent papers on the subject were published in England in 1905 by H. Batty Shaw and R. H. Tribe,¶ and by F. Langmead.** For a concise summary of the subject Langmead's article†† on "Cyclical Vomiting," in 1912, may be consulted. These articles give references to other literature connected with the subject.

The affection occurs chiefly after the first year of life, between the ages of 2 and 11 or 12 (especially between 5 and 8 years of age), and more often in girls than in boys. I hesitate somewhat to accept the history given in the present case (P. H—) of its having commenced immediately after birth, though that is of course possible; Rachford alluded to a case which began at 2 months of age. Cyclic vomiting with acetonuria may occur in more than one child of the same parents. Burrage saw a brother and sister who were both affected.‡‡ Very interesting is the occurrence of migraine, or so-called "recurrent biliousness," or recurrent "sick headache," in members of the same family; but in the present case (P. H—) there is no family history of migraine, though I at first understood that there was. In the patient herself it would not be surprising if the mental symptoms (drowsiness, &c.) became transformed after puberty (as they have been apparently in some other cases) into recurrent attacks of migraine.

In regard to the nervous manifestations and the family history, obtained in some cases, of neurotic diseases, the condition of cyclic

* Cf. F. Parkes Weber, 'Lancet,' 1916, i, p. 1234.

† S. Gee, 'St. Bart.'s Hosp. Rep., London, 1882, xviii, p. 1.

‡ Griffith, 'Amer. Journ. Med. Sci.,' Philadelphia, 1900, cxx, p. 553.

§ Edsall, *ibid.*, 1903, cxxv, p. 629.

|| Marfan, 'Arch. de Méd. des Enfants,' Paris, 1901, iv, p. 641. For a recent paper by Marfan on this subject see 'Presse Médicale,' Paris, 1916, xxiv, p. 397.

¶ Shaw and Tribe, 'Brit. Med. Journ.,' 1905, i, p. 347.

** Langmead, *ibid.*, 1905, i, p. 350.

†† Langmead, 'Practitioner,' London, 1912, lxxix, p. 24.

‡‡ T. J. Burrage, 'Journ. Amer. Med. Assoc.,' 1909, liii, p. 2099.

vomiting might be compared not only to recurrent migraine in adults, but to minor forms of cyclic or periodic insanity with mental depression. From the metabolic point of view one is reminded of recurrent so-called "bilious" or "digestive" disorders and likewise to the diseases which A. E. Garrod* has termed "inborn errors of metabolism"—conditions which may have a markedly familial distribution. In certain cases of cyclic vomiting in children enlargement of the liver (sometimes jaundice) has been noted in connection with the attacks.

In the present patient (P. H—) pyrexia has not been associated with the attacks whilst she was under observation, but most of her attacks do not last long, and she has probably seldom come under medical observation; it was only the exceptional length of the attack in June, 1916, which brought her to the hospital. Pyrexia has been associated with the attacks of cyclic vomiting in various published cases, but the temperature rarely exceeds 100° F.

E. I. Spriggs† writes: "In determining whether the condition of acidosis (in recurrent vomiting of children) is a primary or secondary one it is important to know whether acetone bodies have been absent from the urine before the symptoms definitely commenced; their presence in the prodromal stage in individual cases might be due to abstinence from food, and will not have the same significance as their absence. J. P. Crozer Griffith recorded absence of acetonuria in the prodromal stage, and Langmead also came to the conclusion that the acetone bodies are secondary in their appearance to the vomiting." In the present case (P. H—), as I have already stated, the reactions for acetone and diacetic acid became positive in the urine after the commencement of the vomiting and persisted, in spite of the urine being rendered neutral or slightly alkaline by the administration of sodium bicarbonate, till a day or two after the child seemed well again.

The cyclic vomiting and the excess of acetone bodies (in the blood and urine) might be, not dependent the one on the other, but due to some (unknown) toxic or metabolic cause common to both of them. One can imagine the gradual accumulation in the body of some abnormal and toxic metabolic product (the result of an "inborn error of metabolism") giving rise to recurrent or periodic (cyclic) "explosive" attempts, of a *conservative nature* (from the modern Darwinic teleological point of view), on the part of the organism to rid itself of the accumulation—a kind of vital "Geyser-

* Croonian lectures before the Royal College of Physicians, London, 1908.

† Spriggs, "Acidosis," *Quart. Journ. of Med.*, Oxford, 1909, ii, p. 341.

like" reaction of the body, serving the purpose of a safety-valve escape. Such an intermittent mode of vital reaction (by "periodic explosions") might be regarded as an abnormal inborn peculiarity of certain children, which, at or before the period of puberty, usually gives place to a continuous (adult) method of reaction, though traces may remain during adult life, in the form of recurrent attacks of migraine, recurrent "sick-headache," recurrent "bilious vomiting," recurrent periods of mental irritability accompanied by anorexia and various gastro-intestinal troubles, or yet other recurrent symptoms.*

It is significant that, though starvation in healthy persons gives rise to a condition of acidosis, some authorities† strongly advise restriction of carbo-hydrate foods in the diet during the intervals between the attacks of cyclic vomiting in children. Moreover, though alkaline treatment (bicarbonates) is useful during attacks of cyclic vomiting with acidosis, it does not follow that the acidosis is the cause of the cyclic vomiting (and its prodromal somnolence and nervous symptoms).

In this connection one must of course remember that non-diabetic acetonuria or diaceturia, or both, may be observed in association with many various conditions, especially in childhood. I have recently seen the following cases in which acetone bodies were present in the urine :

CASE 1.—Fatal tuberculous meningitis in a boy (H. D—) aged 6 years. The presence of acetonuria and diaceturia in this case tended to obscure the true nature of the vomiting, which had been the prominent symptom for fourteen days before admission to hospital. The diacetic acid, but not the acetone, disappeared from the urine before the child's death.

CASE 2.—A female child (M. B—), aged 1 year, in whom acetonuria and diaceturia were temporarily present after vomiting and diarrhoea, due to gastro-enteritis, in June, 1916.

CASE 3.—A female child (B. K—), aged 3 years, after vomiting of uncertain causation, possibly an example of "cyclic vomiting," for the mother said that the child had had occasional attacks of vomiting since the age of three months. The symptoms soon passed off.

* The various forms of recurrent troubles in adults allied to migraine and the paroxysmal neuroses do not seem as yet to have been sufficiently differentiated.

† Cf. Francis Hare, 'St. Bart's Hosp. Journ.,' London, 1908, xv, p. 175. In support of his views he likewise quotes Emmett Holt ('Diseases of Infancy and Childhood,' 1903, pp. 326 *et seq.*), who has seen many cases of cyclic vomiting.

CASE 4.—A female child (A. J—), aged $1\frac{1}{2}$ years, with a superficial burn on the face and moderate pyrexia. Satisfactory recovery took place.

CASE 5.—A girl (M. P—), aged 12 years, with slight Sydenham's chorea, and acute follicular tonsillitis, from which she soon recovered.

CASE 6.—A boy (R. P—), aged 5 years, with pneumonia and temporary acetonuria. He recovered.

CASE 7.—A boy (H. D—), aged $5\frac{3}{4}$ years, after operation for an appendicular abscess. The acetonuria and diaceturia soon disappeared.

CASE 8.—A very bad case of appendicular abscess in a girl (E. R—), aged 5 years, who died three days after operation, probably as the result, partly of septic intoxication, and partly of so-called "late chloroform poisoning." At the necropsy the liver was found to be very fatty, and microscopically it showed much "centro-acinous" parenchymatous degeneration. There was jaundice. I did not see the patient during life, but was kindly enabled to examine the urine passed shortly before death; it contained acetone, bilirubin, and albumin.

CASE 9.—I will mention another case, though in an adult. It was that of a woman (B. L—), aged 28 years, in her fourth pregnancy, with hyperemesis gravidarum. The acetonuria and diaceturia and the hyperemesis persisted in spite of treatment until the uterus was artificially emptied. After that operation the acetonuria and diaceturia disappeared within about five days.

CASE 10.—In a case of hyperemesis gravidarum in which no operative interference was necessary the patient was a primipara (F. B—), aged 27 years; and the acetonuria and diaceturia soon disappeared after the cessation of the vomiting.

In regard to non-diabetic acetonuria and non-diabetic acidosis some recent remarks of Howland and Marriott* may be well quoted here: "We may in many instances liken the mere presence of acetonuria to fever; for it occurs in most of the infectious diseases of children with much the regularity that fever does." Moderate acidosis, they say, is no more unusual or dangerous than moderate pyrexia. But just as pyrexia may be dangerous in itself, so an excessive production of the acetone bodies in itself may determine a

* Howland and Marriott, "A Discussion on Acidosis, with Special Reference to that occurring in Diseases of Children," *Johns Hopkins Hosp. Bull.*, Baltimore, 1916, xxvii, pp. 63-69.

fatal outcome. In regard to the "air-hunger" ("Lufthunger") of acidosis they quote L. J. Henderson* as calling the carbonates of the blood "the first line of defence," and go on to explain that the dyspnœa (of acidosis), better termed "hyperpnœa" or "increased pulmonary ventilation," is an agent of the greatest value in ridding the body of carbon dioxide and thus keeping the reaction within normal limits. Hyperpnœa, they remark, is the best of all the evidences of acidosis to be obtained by physical examination alone; hyperpnœa may almost be said to be acidosis.

P. R. Cooper† has recently described "a case of acute pneumonia in an adult complicated at the outset by marked acidosis"; and it would be interesting to know if some of the "hyperpnœa" in certain cases of pneumonia in which only a small proportion of lung tissue is apparently affected, is mainly due to an associated condition of acidosis.

In regard to post-mortem examinations on children suffering from cyclic vomiting (Langmead,‡ J. Comby,§ A. E. Russell||, etc.), I think it must be admitted that the occasional presence of such conditions as appendicitis, hypertrophic stenosis of the pylorus, and degenerative changes in the glands of the stomach, do not throw much light on the true nature and ætiology of cyclic vomiting.

ADDENDUM.

In the discussion on the foregoing paper several further questions were brought up. I had not in the paper entered on the subject of preventive treatment, that is to say, treatment between the attacks of vomiting, but the strict limitation, or avoidance, of fatty foods (including cod-liver oil) is certainly advisable, as well as the prohibition of sweets, etc., between meals, and the avoidance of any overloading of the stomach. An occasional alkaline purge (such as "Gregory's powder") would probably be useful.

I am not sure whether the administration of glucose during attacks of non-diabetic acetonuria and diaceturia is so likely to be useful as

* L. J. Henderson, 'Amer. Journ. of Physiology,' 1908, xxi, p. 427.

† P. R. Cooper, 'Clin. Journ.,' London, 1916, xlv, p. 403. I do not, however, find it stated that the patient had not taken a salicylic drug, nor is it mentioned that the urine was tested for acetone as well as for diacetic acid.

‡ Langmead, 'Brit. Med. Journ.,' *loc. cit.*

§ J. Comby, 'Arch. de Méd. des Enfants,' Paris, 1909, xii, p. 721.

|| A. E. Russell, "A Case of Cyclic or Recurrent Vomiting associated with Hypertrophic Stenosis of the Pylorus," Brit. Journ. Child. Dis., 1910, vii, p. 49.

it is when the acetonuria and diaceturia are connected with diabetes mellitus.

In my present case (P. H—) the attacks were not severe enough to demand or warrant the intravenous injection of a solution of sodium bicarbonate, such as is frequently employed in the acidosis of diabetic coma, or threatening diabetic coma. Moreover, intravenous injections (such as those of salvarsan) are often very difficult to carry out in small children.

In the present case also there was no accompanying pyrexia, but the association of considerable fever with attacks of cyclic vomiting might be misleading in regard to diagnosis, as many different kinds of pyrexial diseases in children may be accompanied by vomiting and more or less acetonuria and diaceturia. In a hospital case under my care, to which I have shortly referred, persistent vomiting and the presence of acetone bodies in the urine were early signs of fatal tuberculous meningitis.

The acetone smell of the breath was not noted in the case of P. H—, but is of diagnostic value in many cases, especially in the acidosis of diabetic coma.

The percentage of children (about 50 per cent.) mentioned by Dr. Porter Parkinson in the discussion, as showing the presence of acetone bodies in their urine on admission to hospital, is certainly a very high estimate, and it suggests that in the hospital in question the proportion of children who were rather severely ill on admission was a relatively high one.

In regard to the definition of "acidosis" I do not feel inclined to limit the term to the grave cases associated with decided hyperpnœa. There are many degrees of acidosis, and in mild cases the acetone bodies may be more or less in excess in the urine without there being any threatening symptoms present, such as marked hyperpnœa.

In the discussion Dr. Parkinson also mentioned a valuable clinical test to distinguish diacetic acid in the urine from a salicyluric constituent. The test is carried out by adding a solution of perchloride of iron to two specimens of the urine, an unboiled specimen and another specimen which has been previously subjected to prolonged boiling. If, on adding perchloride of iron, a red colour is produced in the unboiled specimen but not in the other, it shows that the urine contained diacetic acid, which in the second specimen has been driven off by the prolonged boiling. This test, however, would unfortunately not reveal the presence of diacetic acid in the urine if a salicyluric constituent were likewise present.

The changes in the liver, found by Dr. Langmead at necropsies on fatal cases of cyclic vomiting with acidosis in children, are very interesting, and there can hardly be any doubt that the liver does really play an important rôle in the production of the clinical syndrome in question. But similar *extremely* fatty livers are, I believe, not rarely found in children with rickets who die during attacks of broncho-pneumonia, etc.

CASE OF HEART FAILURE DURING AN OPERATION
FOR THE REMOVAL OF TONSILS AND ADENOIDS;
HEART MASSAGE THROUGH AN ABDOMINAL IN-
CISION; RECOVERY.*

By W. M. MOLLISON, M.C., F.R.C.S.,

Surgeon to the Ear and Throat Department, Guy's Hospital.

PUBLISHED cases of heart massage are even now not numerous, and successful results are much less numerous, and so I hope the following case may prove of some interest, not only because recovery followed after a considerable period of heart stoppage, but also because during recovery the patient exhibited symptoms which have always been followed by death in previous partially successful cases.

The patient was a boy, aged 6 years. He was slight, but healthy in appearance. He was sent to the Throat and Ear Out-patient Department at Guy's Hospital in August, 1916, by Dr. Channing-Pearce, with a view to operation on the throat. Last winter the boy had had bronchitis and asthma, and it was considered advisable to remove the tonsils and adenoids on that account.

Operation was performed in the out-patient department on September the 5th, 1916. The usual preparation for an anæsthetic was carried out; a purge was given the previous day, and the patient was given a cup of milk at 8 a.m. on the morning of the operation. On account of the lack of qualified assistants two senior students had charge of the operation under my supervision; on several previous occasions they had successfully carried out similar operations. A mixture of chloroform (two parts) and ether (three parts) was administered on an open mask; without any struggling the boy

* A paper read before the Section of Anæsthetics of the Royal Society of Medicine on November the 3rd, 1916.

became unconscious, but the corneal reflex was never lost. The amount of anæsthetic given is not known, but the administrator noted that it was less than he had used before in similar cases. The operation was begun about 1 p.m. The left tonsil was removed successfully; while the right was being removed the boy struggled slightly. He was now turned over on his left side and the adenoids curetted (the operator was left-handed). It was noted that the boy did not struggle while the adenoids were curetted, and he remained inert when cold water was poured over the face; this fact made me realise that the patient was suffering from shock (I had been watching the operation, but taking no active part). On examination the boy was found to be flaccid, respiration had ceased, the pupil was dilated, and the corneal reflex absent.

The head was lowered, the throat cleared of the small amount of blood present, the tongue pulled forward, and artificial respiration by Silvester's method begun; air entered the chest quite freely, but the patient's bluish colour persisted, and it became obvious that no improvement was taking place. At the same time stimulants were being administered, hot cloths were applied to the chest and abdomen, brandy and ether were injected subcutaneously, 0·5 c.c. pituitrin was injected subcutaneously, and another 0·5 c.c. was injected through the chest-wall into the heart. No response followed. Examination with a stethoscope by two of us revealed absence of heart-sounds.

I now decided to open the abdomen and massage the heart. The abdomen was washed over with ether and antiseptics carried out as far as possible: an incision about 4 in. long was made from the ensiform cartilage to just above the umbilicus in the middle line; there was no bleeding from the sides of the incision. In the hurry the liver was superficially incised and a little dark blood oozed from it. The right hand was inserted between the liver and the diaphragm, and the heart was easily felt through the diaphragm; there was no trace of movement. With the left hand on the chest-wall and the fingers of the right hand behind the heart, pressure was exerted at about the rate of ninety times a minute; for some moments there was no response, then some respiratory movements began and continued intermittently; the boy's colour improved and his pupil contracted to about 3 mm.; still there was no attempt at heart contractions. This attempt at respiration I suggest was due to the slight artificial circulation produced; blood was driven to the medulla and the respiratory centre stimulated into action. One of the students relieved me at the massage, which

proved somewhat tiring; I then resumed, but still failed to get any response. I now injected nearly 1 c.c. of pituitrin into the heart, guiding the needle through the chest-wall towards the fingers of the right hand, thus making certain it entered the heart. Massage was now renewed, and after about twenty more squeezes the heart suddenly began beating strongly.

It is extremely difficult to make definite statements as to times in cases of great urgency, like this one, and in view of the subsequent history it is of great interest to try to arrive at an accurate estimate. The whole incident lasted from 1 p.m., when the operation was begun, to 1.35 p.m., when the boy reached the ward. The operation took a very short time, perhaps three minutes, and the sponging of the face and sponging out of the throat and mouth perhaps another three minutes. This is, I am sure, a generous estimate, but as against that one must consider that the operation may not have started till 1.2 p.m. There was almost no interval between this and the commencement of artificial respiration; it is probable that the heart stoppage came on immediately after the removal of the second tonsil, and thus we arrive at the conclusion that the heart stopped at 1.10 p.m. (allowing an extra four minutes for the process of stoppage, this may well have been 1.5 p.m.). Stimulants were applied and artificial respiration continued for about five minutes probably; this brings us to 1.15 p.m. Now the abdomen was opened; one must allow from one to two minutes for preparation for this, as well as for taking off one's coat, washing one's hands, and washing over the abdominal wall with ether. The incision took only a few seconds; indeed, so rapidly was it made that the liver was superficially incised. Massage was begun at once and persevered with till the heart-beat began; this probably took three to four minutes. As soon as it was certain that the heart was beating well, the liver sutures were inserted, and this, together with the application of dressings, occupied about four minutes, perhaps six: this brings the time to 1.30 or 1.32 p.m.; the further two or three minutes were occupied in carrying the boy to bed. From these time-records it is fairly certain that the time during which the heart was stopped cannot have been less than thirteen minutes and not more than twenty-four minutes. During part of this time, however, some slight circulation must have been going on, because, as I have said, respiratory movements started while the heart was being massaged. I may add that the impression of those present was that the heart had been stopped for fifteen to twenty minutes, and not only were the two students present, but an

extremely competent head nurse, who was invaluable, and one other nurse.

The boy's condition was still very poor, and no radial pulse could be detected, but his corneal reflex returned. Two catgut sutures were inserted in the liver to draw the edges of the cut together; two sutures only were put into the abdominal wound and a rough dressing applied, and the boy carried to the ward.

Saline infusions were given, and the foot of the bed raised considerably. About an hour later he became restless, and his limbs were rigid or made choreic movements, and the intestines escaped from the wound. My colleague, Mr. E. C. Hughes, kindly operated under light ether anæsthesia and sutured the wound, no drainage being employed.

On recovery from the anæsthetic the choreic movements returned; he ground his teeth, and at one time there was rigidity of the right arm with conjugate deviation of the eyes to the left and upwards.

For the subsequent history of the case I have to thank my house-surgeon, Mr. Wilson, and the sister of the ward, both of whom made careful notes while I was absent on a holiday.

To sum up the history of the next fourteen days: for seven days the boy was more or less unconscious, though he could recognise his mother now and then; consciousness then gradually returned (with relapses). For ten days there was rigidity of the limbs, or choreic movements—at one time both feet and hands were held in the position of tetany. From September the 8th to September the 12th he frequently cried out shrilly (meningitic cry); for thirty-six hours the screaming was almost continuous. For about twelve days he had incontinence of fæces, and for fifteen to sixteen days incontinence of urine (though there was one day on which he had retention of urine for twenty hours). On September the 15th he became very violent, tore his bed-clothes, and tried to eat his blanket. Shortly expressed he had symptoms of severe cerebral irritation, no doubt due to the damage done to the brain during the cessation of the circulation.

At the end of fourteen days he had much improved, and on September the 21st I saw him again; he lay quietly in bed; tried to put his fingers in his mouth; answered questions as to name and age correctly; could not remember what he had for dinner; could count up to twelve, but beyond that he got mixed. On September the 22nd he could sit up; he still had incontinence of urine. The nervous system seemed normal. He made eventually a perfect recovery, and left the hospital on October the 19th. His mental

condition appears quite normal now, and he is mentally fully up to the standard of a child of six.

I submit a table of the published successful cases.

There is one other case published in the 'Journal of the American Institute of Homeopathy,' but unfortunately I cannot find this journal, and so do not know whether the case was successful.

	Name of operator.	Anæsthetic.	Time of ordinary methods.	Time taken to restore heart.	Method.	Operation being performed.
1.	Igelsrud .	?	3-4 min.	1 min.	Resection of ribs and opening pericardium	Abdominal
2.	Lane . .	Ether	2-3 min.	1 or 2 squeezes	Subdiaphragmatic	Ditto
3.	Gray . .	?	?	2 or 3 squeezes	Ditto	Ditto
4.	Cohen . .	CHCl ₃	2 min.	1 min.	Ditto	Ditto
5.	Crile . .	Ether	Nil.	5-6 min.	Rubber suit. method	Exophthalmic goitre
6.	Sencert .	CHCl ₃	7-8 min.	5 min.	Subdiaphragmatic	Abdominal
7.	Conkling .	Ether	2 min.	1 min.	Through chest wall	Region of chest wall
8.	Smith . .	CHCl ₃	3 min.	1 min.	Subdiaphragmatic	Examination of rectum
9.	Ramsay .	CHCl ₃ and ether	4 min.	1 min.	Ditto	For prolapse of uterus
10.	Rutherford .	CHCl ₃	1-2 min.	12 squeezes	Ditto	Whitehead's operation
11.	Milne . .	CHCl	2 min.?	1 squeeze.	Ditto	Operation not begun
12.	Sichell .	C.E. and ether.	1 min.?	"A short time"	Ditto	Ditto
13.	Frazier .	Ether then CHCl ₃	1-2 min. or less	2 min.	Ditto	Hydrocele just begun
14.	Mollison .	C.E.	13 min.	4 min.?	Ditto	Removal of tonsils and adenoids

The first nine cases were quoted by Green (*Lancet*, 1906, ii, p. 1708); only in case 9 is any note made of after-effects. In case 9 it is noted the patient slept for four hours and was at times delirious. She was better the next day.

It will be noticed that in most of the cases only a short time elapsed before massage was begun, and indeed in some of the cases one wonders whether the heart would not have recovered without the massage.

It was Green, in 1906, who pointed out that really the partially successful cases were the most interesting, as showing the great vitality of the heart. In all these partially successful cases, where the patients have lived for periods varying from two to twenty

hours, the symptoms noted have been unconsciousness or semi-consciousness, rigidity or cramps in the arms, incontinence of urine. It was Russell who pointed out that these symptoms also occurred in cases of temporary cerebral anæmia from various causes, other than heart failure under anæsthetics. These statements rather lead me to think that my case is, as it were, a link between success and failure. Indeed, probably the strongest evidence that the circulation was arrested for some long time, even if the heart had not stopped beating, lies in the after-history.

I take it there are two lessons to be learned, the first that heart massage ought not to be postponed too long, probably not longer than five minutes after heart stoppage has occurred; the second, that even if a longer time has elapsed, massage ought always to be carried out through an abdominal wound. The real difficulty lies in making up one's mind that the heart will not recover without some desperate measure; it would be most unwise to lay down a rule that subdiaphragmatic massage should at once be undertaken in every case of heart failure under an anæsthetic.

Two other problems arise in connection with the case: Why did the boy have heart failure? Was it that anæsthesia was too light, or was it a case of vagal inhibition? Were contractions continuing in the auricles, but not getting through to the ventricles? And did the pituitrin play any special rôle in assisting recovery, or did it lead to any of the symptoms during the period of recovery? Of none of these am I competent to suggest any solutions.

A RETROSPECT OF OTOLOGY.

By MACLEOD YEARSLEY, F.R.C.S.,

Otologist to L.C.C. Deaf Schools; late Senior Surgeon to the Royal Ear Hospital; etc.

THE war continues to affect the literary output of medicine and surgery, and that of otology is not the only one of the special branches to suffer. In general, the chief surgical literature deals with the injuries of battle, and pædiatrics have no concern therein.

It is interesting and, to those who venture to try and think for future generations, satisfactory to note how, year by year, the tendency in otological literature is towards prevention. Glancing through a list of twenty-two papers that have been selected for notice in this retrospect, one finds that no less than eleven of them

deal more or less directly with the prophylaxis of deafness and ear disease in children. The otologists, it is to be regretted, are not altogether the people to whom thanks are owing for this; the majority of them seem still to be too fascinated by the blandishments of fine distinctions in mastoid operations or new methods of eliciting nystagmus to be able to look round on the magnificent field that the prevention of deafness offers for the enthusiastic investigator. Probably the otologists will be the last to enter that field as a body, as new movements often find their greatest obstructions in the inertia of old prejudices. If the transactions of the Otological Section of the Royal Society of Medicine for 1916 be examined, it will be found that out of twenty-four items discussed only four could have any possible bearing on prevention (three having to do with otosclerosis and one with catarrh in persons over middle age). Of the remaining twenty, eight deal with mastoid operations, eight with the external auditory canal and injuries, the remaining four with malignant disease, tinnitus, otogenic facial paralysis, and congenital syphilis.

The most important papers and articles that are concerned with the prophylaxis of ear disease and its resulting deafness are as follows:

"The Prevention of Respiratory Diseases in Early Life," by R. Haynes ('Arch. of Ped.,' xxxiii, p. 81), and the "The Reaction of the Child to a Faulty Environment," by H. C. Cameron ('Practitioner,' xcvii, p. 246) deal with the catarrhal troubles that lead to so much primary ear disease in infancy and childhood; and a paper on "Complications in Tonsil and Adenoid Work with Special Reference to Chronic Suppurative Otitis Media," by H. M. Becker ('Annals of Otology,' xxv, p. 439) contains some useful remarks upon the unnecessary occurrence of middle-ear suppuration after operations on the fauces and naso-pharynx.

Yearsley (BRITISH JOURNAL OF CHILDREN'S DISEASES, xiii, p. 129) discusses the anomalous and inadequate directions of the Board of Education as to "Hearing Tests in School Children."

A good deal of work has been done in the direction of prevention in regard to some of the infective diseases, notably measles, epidemic cerebro-spinal meningitis, and congenital syphilis. In a leading article, "The Notification of Measles," in the 'Journal of Laryngology' (xxxi, p. 273), Yearsley points out the high death-rate in children from measles and the high deaf-rate from the same cause. He welcomes the order of the Local Government Board as a firm step towards the prevention of deafness. The 'Practitioner' (xcvi,

p. 1) published a series of papers by Sir William Osler, H. D. Rolleston, M. G. Foster, A. G. Rob, and J. F. Gaskell upon the treatment, and one by H. Sutherland upon the causes, of cerebro-spinal meningitis. The latter author speaks also upon "The Origin and Prevention of Cerebro-spinal Meningitis" in the 'Lancet' (1916, ii, p. 828). All these papers have a bearing upon the prevention of deafness, since the percentage of cases of deafness following spotted fever has increased, in the reviewer's experience, from 0.16 to 0.66 in the past four years.

With the issue of the Report of the Royal Commission and the activity of various bodies, the question of syphilis, and especially of the congenital form of the disease, is at last receiving active attention. Among the many papers which have been published during the year on this subject, the following are the most useful: "Syphilitic Disease of the Ear," by J. G. Fraser" ('Edinb. Med. Journ.,' xvii, p. 5); "The Value of the Luetin Reaction in Congenital Syphilis," by M. B. Gordon ('Arch. of Ped.,' xxxiii, p. 186); "The Medical Profession in the Camp *versus* Venereal Disease," by Otto May" ('Lancet,' 1916, ii, p. 893); and "The Problem and its Solution" ('Interstate Med. Journ.,' xxiii, p. 600). The last-named deals with syphilis from many points of view.

Among miscellaneous papers attention is drawn to the following:

Middle-ear Suppuration.—J. Guttman ('Annals of Otology,' xxv, p. 389) suggests, in a paper entitled "An Improved Method of Draining the Tympanic Cavity in Purulent Otitis Media," a reversion to an old method, the trephining of the tympanic membrane. A. Bardes writes a useful article on "The Discharging Ear" ('Med. Record,' xc, p. 588, and J. A. Colliver ('Arch. of Ped.,' xxxiii, p. 434) discusses "Obscure Manifestations of Otitis Media in Infancy and Childhood." This writer is not an otologist, and although the facts as to the otitides of infectious diseases, influenza, etc., with which he deals, are most of them well known to aural surgeons, it is good that they should be brought before the general medical public by one who is not a specialist.

Marriage ('Journ. of Laryngology,' xxxi, p. 3) writes upon "Skin-grafting in Mastoid Operations." Disliking the idea of two operations where one may be sufficient, he prefers to use a primary skin-graft.

The *Complications of Middle-ear Suppuration* are represented by several papers. Attention is drawn to the case of a boy, aged 13 years, reported by Dan McKenzie ('Journ. of Laryngology,' xxxi, p. 38), in whom a lateral sinus thrombosis was followed by a tuberculous

abscess in the gluteal region simulating a pyæmic abscess. *Cerebellar Abscess* is the subject of two papers in the 'Annals of Otology.' One, "The Diagnosis of Otitic Cerebellar Abscess," by A. Braun (xxv, p. 1), is a valuable and exhaustive contribution. It contains records of eighty-six cases, of which twenty-two were of ages varying from four to sixteen. A natural corollary of this paper is that by J. Friesner on "The Etiology and Pathology of Otitic Cerebellar Abscess."

Three other papers require notice: "Vincent's Inflammation of the Middle Ear and External Canal," by J. Adam ('Journ. of Laryngology,' xxxi, p. 31), in which it is pointed out that infection by the ear of Vincent's organism is a graft upon a previous infection and that the disease is one of gross neglect; "Tuberculosis of the Middle Ear," by W. B. Graham ('Annals of Otology,' xxv, p. 105), which describes nine cases, six of which occurred in children; and a "Final Report on the Isolation and Cultivation of the Tubercle Bacillus from the Discharging Ear in Cases of Chronic Purulent Otitis Media," by G. H. Cocks and J. G. Dwyer ('Journ. of Laryngology,' xxxi, p. 288).

Royal Society of Medicine.

SECTION FOR THE STUDY OF DISEASE IN CHILDREN.

Friday, October the 27th, 1916.

The President, MR. SYDNEY STEPHENSON, in the Chair.

A Family showing Cleido-cranio-dysostosis.—Dr. FREDERICK LANGMEAD.—In the family of which some members were exhibited the condition appeared to have been present during four generations. Personal observation had been made only in the present family group which numbered six alive and one dead.

(1) A. W—, aged $7\frac{1}{2}$ years: Each clavicle was in two parts, a sternal three-fourths and an acromial fourth. The outer extremity of the sternal portion was situated about $\frac{1}{2}$ in. above and anterior to the inner extremity of the acromial portion. The fontanelle was closed and there were no open sutures. Frontal sinuses normal. Palate narrow and arched. Teeth good and regular. Little fingers short, reaching just beyond the proximal inter-phalangeal joint.

(2) B. W—, aged 6 years: The acromial extremity of each clavicle just failed to meet the acromion and was unduly mobile. Nothing particular about the cranial vault, but the palate was narrow and very arched. Teeth normal.

(3) M. W—, aged 5 years: The left clavicle did not quite reach the

acromion and was unduly mobile. About its mid-point there was a sharp bend forwards, the apex of which was somewhat thickened. The right clavicle showed the same malformation as that of A. W—. Anterior fontanelle measured $2\frac{1}{2}$ in. laterally and $3\frac{1}{2}$ in. antero-posteriorly. Palate very narrow and arched; no other cranial change.

(4) V. W., aged 3 years 8 months: Right clavicle small and movable; left clavicle tailed off to the outer end, and had a sharp lower edge with forward projection near the centre. The forehead was large and bossed, and over it the veins were dilated, particularly in the bregmatic region. There was obvious nasal obstruction. The anterior fontanelle was large, measuring about 3 in. in each direction; in front it communicated with a patent metopic suture; below it was continued as a definite groove which terminated in a posterior fontanelle admitting a finger tip. The palate was highly arched. There were some signs of rickets in the beading and shape of the thorax, the enlargement of the lower end of the radii, and the prominent abdomen. The liver edge reached for about $1\frac{1}{2}$ in. below the costal margin.

(5) Twin (with V. W—): Died as an infant from progressive hydrocephalus. No other particulars known.

(6) G. W—, aged 2 years: Right clavicle normal. Left clavicle: Curves very exaggerated and acute bend in its middle; fontanelle closed. Palate very arched and narrow. Dentition: Twelve teeth erupted which were well formed.

(7) W. W—, aged 8 months: The inner half of the right clavicle was present and rather more of the left. The anterior fontanelle was about 4 in. in breadth and the metopic suture patent. Posteriorly it nearly reached the posterior fontanelle, which measured about $1\frac{1}{2}$ in. in each direction. Palate very arched and narrow. Some exophthalmos.

Mrs. W— (mother): Left clavicle normal; sternal three-fourths only of right clavicle present. Palate very arched. Cranial vault large and somewhat overhanging. The fontanelles were said to have been very large and not to have closed until she was aged about 20 years.

None of the cases showed any obvious defect of the frontal sinuses or facial bones, and the stunting of the little fingers was confined to the oldest child. There were no sternal abnormalities.

Case of Supposed Intrathoracic Neoplasm.—Dr. C. E. LAKIN showed a girl, aged 16 years, who first came under his observation in May, 1914, when she showed enlargement of the veins of the right side of the chest, dullness on percussion over the manubrium sterni, and over the neighbouring part of the chest wall, immediately to the right, and intense tubular breathing over the dull area. The veins filled from above. A screen examination showed a definite shadow above and to the right of the heart, and a diagnosis of an intrathoracic neoplasm compressing the vena cava superior, and probably malignant in nature, was made. The blood gave a negative Wassermann reaction.

In September, 1914, intense tubular breathing was audible over the whole of the upper lobe of the right lung, and there was defective resonance on percussion over the same area. In January, 1915, numerous râles had appeared, but the general condition of the patient was not worse. In June, 1915, râles had disappeared, but intense tubular breathing was still heard over the manubrium sterni and less intense bronchial breathing over the upper lobe of the right lung. In April, 1916, rhonchi were heard over the

right upper lobe especially, but the breath sounds over the manubrium were diminishing in intensity. When it became clear that the intra-thoracic condition could not be malignant in nature the differential diagnosis lay between a benign neoplasm and a mass of tuberculous glands.

Hypopituitarism.—Dr. E. A. COCKAYNE showed a boy, aged 9 years, who had appeared healthy and intelligent at school until two years ago. He then became languid, and complained of severe headaches. Later muscular weakness was noticed. Gait began to alter eight or nine months ago, and speech became slurring and indistinct. Sometimes he complained that he could not read owing to lines appearing blurred. No fits. No polyuria. Began to get fat six months ago. Father treated recently for locomotor ataxia. Mother had had seventeen pregnancies. There had been seven to nine miscarriages (second to sixth months), and four or five children had been premature, two stillborn. Patient born at full term. Two children alive and well.

On admission to the hospital on July the 5th, 1916, the child was dull and apathetic, with continual tremor of arms and legs. He talked intelligently for a time, and then lapsed into baby talk and speech slurring and indistinct. Gait unsteady. Knee-jerks exaggerated. Ankle clonus present on both sides. Plantar response flexor. Triceps-jerks exaggerated. Pupils: Right reacted to light and accommodation; left reacted slightly and very sluggishly. Mr. Attlee reported that both discs are chalky white, with very small arteries (optic atrophy). Vision: Right, $\bar{c} + 1.5 = \frac{6}{36}$; left, $\bar{c} + 1.5 = \frac{6}{60}$. Bulging forehead. Teeth slightly peg-shaped. Very marked deposit of fat all over body, but especially in mammary region, round pelvis, pubic region, hips, and thighs. Penis very small. Testicles small. Genu valgum. Wassermann's reaction positive on July the 10th.

Three intramuscular injections of galyl were given: 0.1 grm. on July the 21st, 0.15 grm. on July the 27th and August the 2nd. He had become slightly worse, and for the first time some loss of control of bladder and anal sphincters had been noticed. On August the 11th Wassermann reaction in blood markedly positive.

Werdnig-Hoffmann Type of Spinal Muscular Atrophy.—Dr. COCKAYNE also showed a male infant, aged 3 months. First child. No history of similar condition in family. Healthy at birth. Up to the age of 14 days used to kick and suck his thumbs. Then he began to lose power gradually, and to cry less often. He now lay with arms everted and pronated. The fingers were partially flexed, and the thumbs extended. He could move his arms a little, but the lower limbs, except the feet and toes, were paralysed. The upper and lower limbs, neck and back muscles were in a condition of flaccid paralysis. There was some paralysis of the intercostal and abdominal muscles, but the diaphragm moved normally. Abdominal reflex, knee-jerks, and Achilles-jerks absent. Sensation appeared to be unaltered. In the leg and arm muscles reaction of degeneration was present. Some wasting could be detected, but the child was gaining weight. The child took notice and smiled. Profuse sweating occurred daily. Bronchitis had been present for some weeks.

Papulo-Necrotic Tuberculide.—Dr. J. L. BUNCH showed a youth, aged 17 years, who had been under his care for ten years. He first

developed a skin eruption at the age of 4 years. This began as a simple red patch near the umbilicus, on which small, red nodules showed themselves later. The nodules were slightly raised, papular in character, and distinctly infiltrated, but small and apparently quite superficial. They were always succeeded by a shallow scar about $\frac{1}{8}$ in. to $\frac{1}{3}$ in. in diameter. In 1906 there were about thirty of such scars round the umbilicus, and the skin of this area was dry, scaly, and red, and covered with a fine desquamation. On the inner sides of the thighs, and for some distance round each axilla, there was a circumscribed, irregular, superficial, pinkish dermatitis, with a similar fine scale on the surface.

During succeeding years the areas which formerly only showed a superficial dermatitis had become covered with a number of small, shallow, atrophic scars, similar to those round the umbilicus, which had persisted. Still more atrophic scars had made their appearance over the skin of the abdomen, so that, at the present moment, there were a very large number of scars. The disease was progressive, for fresh lesions continued to appear. Before any fresh area showed any signs of papules or scars, it was, for some long period previously, invaded by a characteristic, scaly dermatitis.

Inoculation experiments on guinea-pigs and microscopic examination of the lesions proved that the lesions are tuberculous.

Tuberculin treatment, and especially Rosenbach's tuberculin treatment, improved the condition for a time, but relapses occurred.

Many methods of treatment had been tried, but, although they alleviated, none seemed capable of curing the disease. The patient's general health was good, and no signs of other tuberculous disease could be detected.

Pityriasis Rosea with Unusual Distribution.—Dr. BUNCH also showed a girl, aged 8 years, who had developed a typical eruption of pityriasis rosea a week ago, so far as the trunk was concerned. But, six or seven days before this eruption appeared, a "herald" patch made its appearance in the right frontal region, and was still well marked.

Demonstration of Speech-records from Case of Hypopituitarism.
—Dr. E. W. SCRIPTURE.

Cerebral Diplegia with Abnormal Flexibility of Joints.—Dr. F. PARKES WEBER (*v. p. 31*).

Friday, November the 24th, 1916.

DR. LEONARD GUTHRIE, *ex-President, in the Chair.*

Family Splenomegalic Acholuric Jaundice.—Dr. LEONARD GUTHRIE.
—A girl, aged 10 years, was brought to hospital on September the 7th, 1916, on account of her yellow skin and occasional "bilious attacks." At the age of 9 years she had icterus for a short time, and has always been slightly yellow since. The "bilious attacks" at first occurred monthly, but she had only had three in 1916. They usually happened in bad weather. She did not vomit, but complained of headache, nausea, and of feeling seedy. The yellowness became darker, the urine "like tea," and the stools remained brown during these attacks, which lasted two or three days. In the intervals she was perfectly healthy.

Past history.—She was subject to bronchitis until tonsils and adenoids were removed at the age of $2\frac{1}{2}$ years.

Family history.—No history of tuberculosis. Mother healthy. Father had icterus at the age of 9 years for a short time and had been yellow ever since. Three years ago he was told that he had a large and "interesting" spleen. Until three years ago he was liable to attacks of gastritis, but since wearing a belt, and dieting himself, he had been better, though he always felt unwell in bad weather. There were three children, all girls, in the family, and one died (the first-born) of meningitis at the age of 10 months. The second daughter has suffered from ascites (see next case). The youngest, aged 3 years, had quite recently become sallow like her sister; the spleen could be easily felt below the ribs, and the conjunctivæ were slightly icteric.

Present condition.—A well-grown fairly healthy looking girl. No complaint of any kind. Lips and mucous membranes distinctly pale. Skin generally of a pale brownish-yellow hue. Conjunctivæ of a primrose yellow, which varied in depth from day to day. Heart and lungs healthy. Faint systolic (hæmic) bruit heard at cardiac base. Pulse regular, rate 96, fair tension and volume. Abdomen not distended. Spleen could be felt 7 cm. below costal margin in nipple line. It was smooth and rather hard. Both anterior and posterior borders could be palpated, and the organ could be nearly encircled by hand. The enlargement was downwards rather than towards the umbilicus. Liver could be felt 2 cm. beneath the costal margin. Its edge was smooth. Submaxillary glands enlarged, but not shotty. Urine: Acid, clear, dark in colour; it contained no bilirubin, but gave the chemical reaction for urobilin; spectroscopic test not available; albumin, sugar, acetone, bile absent. Stools very deeply pigmented brown; apparently free bile present. Blood: Wassermann reaction negative; red blood corpuscles, 3,320,000 per c.mm.; white blood corpuscles, 5000 per c.mm.; hæmoglobin, 65 per cent.; colour index, 1; poikilocytes, present; polychromatophilia, slight; nucleated red cells, none. Differential count: Polymorphonuclears, 67·6 per cent.; small lymphocytes, 27·2 per cent.; large mononuclears, 3·2 per cent.; eosinophilia, 1·2 per cent.; mast-cells, 0·8 per cent. Fragility of red blood corpuscles: Mr. Herbert Perkins reported that blood was completely laked by salt of 0·4 per cent., whilst hæmolysis was completely inhibited by salt of 0·5 per cent. Two control bloods examined at the same time under identical conditions were completely laked by salt of 0·3 per cent., whilst hæmolysis was completely inhibited by salt solution 0·4 per cent.

Ascites of Obscure Origin.—Dr. GUTHRIE also showed a girl, aged 7 years 7 months, sister of the first case, who was admitted to hospital on May the 10th, 1916, for swelling of the abdomen, noticed two days.

Family history.—See Case 1.

Past history.—Measles, whooping-cough. A very nervous child, subject to "habit chorea" for about three months. Otherwise perfectly well until three weeks ago, when frequency of urination commenced. No large amount of urine was passed. There was slight pain before micturition in the lower abdomen and at the pit of the stomach. Bowels always regular, no diarrhoea, no vomiting, no cough or night sweats. She had been to school until the week of admission.

Condition on admission.—A fairly well-nourished and well-developed child. Skin a little sallow, but lips and mucous membrane of good colour. Thorax: Well shaped; lungs clear on auscultation and percussion; heart not enlarged, sounds clear and strong, a systolic hæmic murmur heard at base and along sternal margin. Abdomen: Much distended, flanks bulging, dullness

practically everywhere up to umbilicus, and fluctuation easily elicited. No pain or tenderness on palpation, liver and spleen could not be felt owing to abdominal tension. No glands or other masses were palpable. The swelling had only been noticed for two days, and had rapidly increased. Lymph glands nowhere enlarged. Urine: Acid, clear; trace of albumin; occasional finely granular casts seen under microscope.

May the 14th, 1916.—Von Pirquet's reaction positive but late in appearance. Temperature, 97° to 100° F. Abdominal circumference, 63 cm. Child made no complaint of pain. There was no frequency of micturition now.

May the 21st.—Abdomen much more distended. Child no longer able to sit up. Heart displaced upwards, maximum impulse in second intercostal space.

May the 29th.—Operation became necessary owing to displacement of heart and embarrassment of respiration. Mr. FitzWilliams opened the abdomen and evacuated about a gallon of fluid. Patient bore the operation well, and in the evening said she could breathe much better. The heart's apex had descended to the third left interspace.

June the 1st.—Patient much more comfortable since operation. Heart's apex now in fourth interspace. Abdomen still considerably distended, but by flatulence. Temperature subnormal or normal.

June the 11th.—Patient sitting up and quite happy. Abdomen fairly natural-looking. A little fullness still present. In appendix region was a small indefinite mass, and to the left of umbilicus are numerous small deep irregularities. No definite large mass or band of adhesions to be felt. Liver and spleen not palpable.

June the 26th.—Sent to convalescent home for a fortnight. Patient was perfectly well and had no symptoms of any kind. She has been under observation until present time. There had been no return of fluid, the liver and spleen were not enlarged, and no masses of any kind had been detected in the abdomen.

Nothing was known of the family history of splenomegalic acholuric jaundice until after her discharge from hospital. The ascites was regarded as tuberculous. The positive von Pirquet's reaction, the slight pyrexia, and the discovery after evacuation of the fluid of small indefinite masses which might have been glands are in favour of tuberculosis. No tubercles were seen at the time of operation, but no special search was made for them. On the other hand, if tuberculous, the course of the ascites was unusual. The amount of fluid in such cases was seldom excessive, it did not increase rapidly, and it subsided as a rule under rest in bed and graduated pressure. In this case, under similar treatment, the fluid rapidly increased and caused such pressure and displacement of the heart and lungs that operation was inevitable. The question of possible relationship between the ascites and the family complaint therefore arose. The patient up to the present had not been jaundiced, nor was the spleen enlarged, nor was she markedly anæmic like her father and sisters. But she might possibly develop these symptoms later, and the ascites might be an early and unusual manifestation of the family complaint.

Dystrophia Adiposa Genitalis, with Congenital Lues.—Dr. FREDERICK LANGMEAD showed a boy, aged 15 years, who had always been backward. For the first three years of his life he was under constant

medical care for "general weakness, wasting, and skin rashes." He did not walk until the age of 3 years, and could not speak distinctly until aged 4 years. At school he did not learn, take part in games, or make friends with other boys. When he was aged 13 years it was noticed during routine examination that he could not see with the left eye. After leaving school he started work (upholstering), but seven weeks later caught his fingers in a machine, and two of them had to be amputated. Soon afterwards he developed a facial tic, which persisted. He was stunted and obese, and feminine in build. Mentally he was childish, equal perhaps to a child aged about 7 years. His scrotum was divided by a deep groove, but without actual cleavage, and the general appearance of the external genital organs was feminine. The penis was very small, and the testicles were rudimentary. He had some want of control over the bladder, but there was neither polydipsia nor polyuria, the amounts passed in twenty-four hours varying from 13 oz. to 50 oz., and averaging about 30 oz. There were well-marked stigmata of congenital lues in the scars at the angles of the mouth, Hutchinsonian teeth and eyes. Ophthalmoscopic examination showed advanced disseminated choroiditis with waxy atrophy of the disks much more marked in the left eye than in the right. The visual defect was therefore local in origin. A skiagram showed perhaps a little smallness of the pituitary fossa and prominence of the posterior clinoid process. About 130 grm. only of dextrose could be retained, and these were followed by no glycosuria. The sugar content in the blood was about normal. His father died when aged 45 years from general paralysis, and his mother had *tabes dorsalis*. An elder sister aged 21 years, and a younger brother aged 8 years, were in good health.

Diabetes and Infantilism.—Dr. J. PORTER PARKINSON.—A girl, aged 10 years, who had been healthy and fat till four years ago, since when she had become much thinner, been very thirsty, and had had an excessive appetite; for about three months the parents had noticed that she passed excessive amounts of urine. The family history was very good; there are three other children quite healthy and patient has had no previous illnesses. Patient had hardly grown at all in the last four years.

On admission to the hospital in April, 1916, she was seen to be much undersized and very thin; her height was 41 in. and weight 35 lb., in other words the height of a child aged 5 years, and her weight under the average for that age. The thoracic and abdominal organs appeared healthy, but she passed from 30 to 60 oz. of urine a day, containing usually from 400 to 800 gr. of sugar, but occasionally amounting to about 2000 gr. a day due to increased output of urine, the amount of sugar to the ounce of urine being 15 to 20 gr. to the ounce. The specific gravity of the urine was about 1040; there was usually a well-marked acetone reaction, but no albumin casts, pus, or crystals.

She was given a fairly strict diabetic diet without any result in lessening the output of sugar, and 3 gr. of opium daily also produced no result. From time to time the patient was starved for twenty-four hours, taking nothing but black coffee and well-boiled cabbage, and after each of these fasting days the amount of sugar was very appreciably lessened, being often about a quarter of the usual average, though it had no effect on the output of water. After five months the patient left the hospital in much the same condition as on admission, having only gained 2 lb. in weight.

Skiagrams showed that the sella turcica was normal in size and shape in proportion to the small size of the skull. It measured antero-posteriorly 8 mm., and in depth 7 mm. The radial epiphyses were markedly abnormal in size and shape. All the centres of ossification of the carpal bones had appeared, but the size and shape of the bones themselves suggested those of a child of six.

Growth seems to have almost ceased for the past five years, during which time the symptoms of diabetes had been present; there is no evidence of affection of any gland except the glycosuria. The infantilism was of the Lorain type.

Case of Dermato-myositis.—Dr. E. BRONSON (for Dr. G. A. SUTHERLAND).—A girl, aged 5 years, was admitted to hospital on August the 29th, 1916, with the complaint of rheumatism. One month before admission she had had pains in hands and a week later in legs as well. Gradually all joints in her body became sore, spine, fingers, and toes, as well as arms and legs. She was about the house until one week before entering hospital, when she was put to bed on the advice of the family physician. She had had no sore throat. Nothing abnormal had been noticed about the digestive and urinary system.

Past history: Generally healthy child. Only illnesses, measles and chicken-pox.

Family history negative.

Condition: On admission the skin was moist, smooth, and showed no eruption; over the hands and wrists, one could not pick up skin from subcutaneous tissues, nor subcutaneous tissues from muscles. This condition extended up the forearms, ending gradually below the elbows. There was distinct swelling, slight flushing, local temperature, and tenderness on palpation. Movement at the wrist was painful. The fingers were flexed in a claw position, and could not be completely extended. In the popliteal space there was a condition similar to that in the forearms, and tenderness was especially noticeable here. The toes were similar to fingers, but to a less degree. Patient was not able to flex spine normally, and complained of pain when the head was brought forward.

Further examination showed no pathological conditions, except hypertrophied and unhealthy tonsils, and a slightly enlarged spleen. Urine examination negative. Wassermann and von Pirquet reactions negative.

Blood examination showed: Hæmoglobin, 92 per cent.; red blood cells, 5,180,000; white blood cells, 23,000. Differential count: Polymorphonuclears, 50 per cent.; small lymphocytes, 36 per cent.; large lymphocytes, 4.8 per cent.; eosinophiles, 3.6 per cent.; basophiles, 1.6 per cent.

During a three weeks' stay in the hospital there was no noticeable improvement, except a diminution of pain. Tonsillectomy was performed with no complications. She was under observation as an out-patient for six weeks. During that time the induration increased in extent, and the mother stated that the child was unable to run or go upstairs rapidly. There was still complaint of pain, but less than when admitted to the hospital.

Patient was readmitted on November the 11th, 1916, with generalised hardening of subcutaneous tissues and muscles. The skin over forearms and legs was slightly flushed, and face much flushed. There was a marked *tache cérébrale*. Nowhere over body—face, back, thorax, abdomen, and extremities—could one pick up the skin from the subcutaneous tissues, nor

the subcutaneous tissues from the muscles. On the upper half of the anterior surface of the thighs, over the gastrocnemius and deltoid muscles, were slightly raised indurated pads of tissue. No marked tenderness was elicited anywhere. The joints moved freely within a range limited by induration of overlying tissues. The tongue was protruded freely, and speech was unimpaired.

She had had radiant heat baths, in which she perspired freely, and massage for the past two weeks. During this time there had been noticeable softening of the subcutaneous tissues, especially over flexor surfaces of arms and legs, also on face, back, and abdomen.

Hereditary Neuro-fibromatosis (von Recklinghausen's Disease).

—Dr. E. A. COCKAYNE.—The mother of the children was of dark complexion. She had numerous freckles and there were many *café-au-lait* patches on the trunk and limbs. On the dorsum of the left wrist and right hand were sessile molluscous tumours, bluish in colour. Above the left breast was a patch of thickened skin which was irregular in shape and was probably neuro-fibromatous in nature. Above the sacrum there were some pendulous molluscous tumours. She had only two children. The elder, a boy, aged 5 years 7 months, had a number of *café-au-lait* patches on the trunk, situated both in front and behind. Most of them were oval. He had also an irregular raised area of skin of a bluish-red colour above the left nipple. All these were present at birth. He was nervous and restless, but not mentally defective. The younger child, a girl, aged 10 months, had several oval *café-au-lait* patches on the trunk, especially over the sacral region. These had been present since birth. She appeared to be of normal intelligence. The mother knew of no other cases in the family.

Hereditary and Familial von Recklinghausen's Disease.—Dr. J. D. ROLLESTON showed two sisters, aged 19 and 11 years respectively, who had previously been exhibited at the Clinical Section in 1911 with their father, who was a typical example of von Recklinghausen's disease (*vide* BRITISH JOURNAL OF CHILDREN'S DISEASES, 1911, viii, p. 123, and 1912, ix, p. 281). The mother was not affected.

The eldest daughter since 1911 had developed a large spherical tumour on the inner side of the right upper arm. It was freely movable and quite painless. It was probably a plexiform sarcoma like the swelling which had been removed from her upper lip. The molluscum *café-au-lait* patches and punctate pigment spots had not shown any decided increase in number or size since 1911.

In the younger girl the *café-au-lait* patches and punctate pigment spots had increased in number and size, but no molluscum had developed.

Case for Diagnosis.—Dr. E. PRITCHARD showed a boy, aged 9 years, who had been knocked down by a motor-car and on the next day had cough and pain in the chest. The chest on the left side had become smaller and was dull on percussion except for a small area to the left of the vertebral column, where it was resonant, and a tympanitic area in the left axilla. The heart sounds were very weak. A skiagram showed considerable opacity on the left side. The heart was drawn over to the left.

Speech Records in Cerebral Diplegia, with Indications of a New Method of Treatment.—Dr. E. W. SCRIPTURE.

Philadelphia Pediatric Society.

April the 11th, 1916, Dr. JOHN F. SINCLAIR, in the chair.

Siamese Twins.—Dr. J. T. RUGH.—A doctor was called to attend a mother in labour for her third pregnancy. The other two labours had been normal and the children normal, but there was a history that on the maternal side every female member for three generations who had borne several children, had had one child that was defective in some respect. After considerable difficulty the woman was delivered of Siamese twins. The twins had been brought to Philadelphia with the idea of trying to make them grow and to reach a condition in which they could be operated upon. It was found that each child had its own gastro-intestinal system which was entirely distinct from the other child's. They seemed, however, to have a common liver. In one experiment, one of these children had been given methylene blue by mouth and both children had passed blue urine. Collectively the children have weighed $9\frac{1}{2}$ lbs at birth, the greatest weight being 10 lbs. and 2 ozs. They had no trouble with their gastro-intestinal system and had been able to digest the food given them, which was a 3-6-1 $\frac{1}{2}$ mixture. At the present time their circulation was beginning to show evidence of failure, and it did not look as though they would live. The children were connected from the middle of the sternum to the middle abdomen, the umbilicus being underneath the band of union.

The Teaching of Infant Feeding.—Dr. J. P. CROZER GRIFFITH said that the experience of a good many years of teaching pædiatrics at the University of Pennsylvania enabled him to look back over the developments which had taken place during these years. When he first commenced to lecture on the subject, 25 years ago, the pasteurizing of milk was just coming into vogue. About the same time, too, the first systematic continued effort was made towards the selection of a milk which could be called clean. He had always taught the importance of this, and believed still in the value of pasteurizing for any questionable milk, or even for the best of milk during hot weather. It was important, too, to get milk of fairly uniform strength since without this no uniform results were possible. The belief in the importance of clean milk and of uniform milk had spread very widely throughout the country during the past years.

Dr. Rotch first brought out the necessity of thinking in percentages instead of in quantities. The idea was taken up rapidly by the profession in the United States, and although it apparently did not receive the recognition in Germany and France which it did in America, that the percentage method was actually employed was shown by the fact that the very numerous special milk formulæ, recommended by and often manufactured under the supervision of physicians, were constructed upon the percentage basis.

A few years ago the so-called "caloric method" of infant feeding came into prominence. Dr. Griffith had adopted and taught this with certain very decided restrictions. He believed this method was only serviceable for checking the percentage method. First of all it was not known what a normal child really needed in the way of calories, inasmuch as investigators varied upon this point. This applied with still greater force to children

whose digestion had suffered, and whose weight did not correspond to their age and their size. The caloric method was based upon the weight of the child, but investigation had shown that it was not so much the weight but the body-surface which should determine the heat dissipation and the consequent number of calories which the food should contain to replace this. Further, the activity of the child had a great deal to do with the number of heat-units needed; whether it was asleep or awake; whether it was healthily active or abnormally quiet, as so many marantic children were.

Another comparatively recent idea in infant feeding was that it was not so much the bacterial contamination which played a part in the production of imperfect nutrition as chemical changes in the food in the intestines, or, perhaps still more, disturbed metabolic processes. There was undoubtedly a great deal of truth in this; but many found it difficult to believe that bacteria played so small a rôle as was assigned to them in some quarters.

Another observation which in recent years had been making with reason a continually increasing impression upon pædiatrists was the fact that the various elements of the food did not act separately, but in unison. Some elements could be tolerated or not tolerated if certain other elements were withdrawn. For instance, Finkelstein advanced the belief that a child could stand a high casein-percentage provided the whey with the sugar and the salts contained in it was withdrawn; and that fat, too, might be added to the food, provided the whey was withdrawn. So, too, it had been maintained with reason that malt soup, in which the carbohydrate-percentage was very high, rendered the fat-percentage better tolerated, probably through the presence of a large amount of insoluble carbohydrate. In other instances it had been found that protein-decomposition could be checked by the presence of a high carbohydrate-percentage in the food.

For a good many years Dr. Griffith had tried to emphasize the importance of considering the individuality of the child. This seemed a simple matter, yet was frequently disregarded. No rule or method of feeding an infant could be formulated because other infants of the same age could tolerate a certain food.

The last "new" idea in the matter of infant-feeding was the so-called simple dilution method. This was probably based upon Heubner's recommendation, in his caloric method, to use simple dilutions of whole milk of different strengths, to which sugar was added in the proportions desired. Many of those, however, who had supposedly followed this method had abandoned in reality the methods of their teacher. The simple dilution method as recommended by many was supposed to be a way to avoid all calculations of percentages, on the ground that these calculations were difficult and impossible to be carried out by the average physician. It was called an easy method. Dr. Griffith wished to call the attention of the members to the fact that Heubner not only first calculated the percentages of the different milk ingredients present in the dilutions employed, but went further and calculated the caloric values of these percentages, in order to see whether the food reached the caloric needs of the child. There was certainly nothing easy about this. Artificial feeding was the hardest problem that pædiatrists had to encounter. As to any difficulty applying to the percentage-method as embodied in the employment of top-milk, no physician of average intelligence surely could find the dilution of, for instance, the upper 24 ozs. of a quart of milk with a certain amount of water any more difficult for himself to recommend, or for the mother to carry out under his directions, than was the dilution of whole milk with the same amount

of water. The simple dilution method was all right for those who would take the trouble to really think out the kind and amount of the elements of the food given to the children; but in the hands of those who merely wanted to avoid trouble, its employment was a menace to the patient. It was simply retrograding to where the profession was more than 25 years ago.

June the 13th, 1916.

The President, DR. JOHN F. SINCLAIR, in the Chair

Electrically-lighted Speculum for use in the Diagnosis and Treatment of Vulvo-vaginitis in Children.—DR. PHILIP ATLEE SHEAFF.—In the Children's Vaginitis Clinic of Dr. John F. Sinclair at the Presbyterian Hospital, we have been using the urethroscope as the best available means at our disposal for visual examination of the vagina.

The restricted view obtainable by this instrument has been far from satisfactory, and as the vagina, even in a small child, is quite capacious beyond the hymen, other means than those in hand became desirable.

The instrument which it is my pleasure to present before you this evening is the outcome of research and criticism recently carried out along these lines, and its use has successfully supplanted the urethroscope in this clinic.

By its aid we are able to demonstrate, at one view, a very much larger area of mucous membrane than formerly observed; the entire external os is readily seen, and sufficient room for topical application or the obtaining of discharges from selected areas is maintained.

It consisted of a bi-valvular speculum, tubular in shape, containing an obturator to facilitate introduction; one blade carrying a light chamber upon its inner or concave surface; both blades maintained in relation to each other by a joint of special construction together with a thumb-screw, which latter also controls the separation and approximation of the blades in such a way that a maximum separation of the distal portion is obtained, with very little separation at the vulva. The instrument may be taken apart by removal of the thumb-screw.

The bi-valvular method of dilatation is an old and well-known principle and needs no description, by the construction of the joint in this instrument places the fulcrum in such position that its proximity to the hymen especially fits it for use in small children by meeting anatomical conditions peculiar to that age.

In the instrument presented, the light chamber is within the tubular portion, and is open at its extreme distal extremity beyond the window, this adding to the illumination when the instrument is drawn in the closed condition toward the operator.

The lamp connection in the urethroscope is centred by means of a dowel pin—in the instrument demonstrated the lamp connection is maintained in position by a small clip which prevents dropping out or withdrawal unless a quarter turn of the part be made.

Establishment of a Department of Preventive Medicine in a Hospital for Children.—DR. CHARLES V. DORWARTH.—It is the duty of a hospital treating infants and children to take care of them not only when ill but also to formulate and put into effect measures which will prevent them from becoming ill. To meet these requirements a Department of

Preventive Medicine should be created with a physician at its head to direct the work.

Some of the important functions of such a department are to establish :

(1) *Health clinic*.—A health clinic is a consultation where mothers may bring well children for examination and receive advice which will enable them to keep them well. Children discharged as cured from the ward or dispensary will be referred to the health clinic. Mothers should be urged to bring all their children for examination and advice.

(2) Prenatal clinic and out-patient maternity service, should be in charge of an obstetrician. Here normal pregnant women receive instruction in personal hygiene. At the first visit a history is taken and a complete physical examination is made. The patient is requested to report at regular intervals, when blood-pressure will be taken and a specimen of urine examined. Women attending the prenatal clinic may be delivered in their homes by the physician acting as resident to the Department of Preventive Medicine.

(3) *Social service work*.—The social service work will be in close relationship with all the various functions of the department. The follow-up nurses will visit the homes of the patients in the health clinic and explain the physicians' orders to the mothers. In the prenatal clinic they will demonstrate the preparation of various articles to be used during confinement. Data obtained by the nurse on her visit to the home will be of assistance to the physicians while the patient is being treated in the ward. Provision for convalescent care and summer outing is a duty of this division.

(4) *Division of physical development*.—In charge of a teacher of physical education, a gymnasium to be conducted for subnormal children so that they may acquire firmer muscular development.

Other functions of the department are :

(1) Neighbourhood educational work. Lectures on infant hygiene for parents. Prenatal classes. Instruction in infant hygiene for little girls. Lectures on sanitation and proper housing and demonstrations of unsanitary conditions for boys.

(2) To locate and register wet nurses in the vicinity of the hospital.

(3) To report unlicensed baby farms.

(4) To change environment of children living in immoral surroundings or those living with parents who are mentally deficient.

(5) To co-operate with day nurseries in the district.

(6) To co-operate with city physicians assigned to this district and physicians in the vicinity of the hospital. In order to make the work more effective limit it to the district in the immediate vicinity of the hospital. Many hospitals are doing more or less the work outlined above, but it is suggested that it could be done with greater efficiency if it be correlated to a district department under the headship of a physician qualified to direct work in preventive medicine.

The Health District in Relation to Infant Mortality.—Dr. McC. HAMILL.—The population of our large cities is made up of groups of people representing many nationalities and varying greatly in intelligence. The problems of the different sections of our cities differ, therefore, in their nature and solution. If effective work in the prevention of disease is to be accomplished, the health conditions which these varying groups create must be known and properly interpreted. Health departments as at present

constituted and equipped are not able to study the fields in which they work.

The existing system is also unfavourable to a proper co-operation and co-ordination of the work of the several divisions of the health department and the other departments of the city government that have to do, either directly or indirectly, with the maintenance of the health of the city. It also makes the education of the masses extremely difficult.

The question that naturally arises is—What is the solution of these difficulties? The Child Federation of Philadelphia has been conducting an experiment as a contribution to a satisfactory answer to this question. The experiment referred to is the Federation's Health Centre, and in order that you may understand the application of this answer, I will define briefly the idea and work of the Centre.

The distinctive feature of the method that the Child Federation has pursued in trying to illustrate the value of district direction of the health of a city has been its intensive character. The procedure was as follows: Fifteen city blocks covering the most thickly populated portion of the Italian district were selected for the experiment. This district was chosen for five reasons: (1) It had a high infant mortality; (2) it contained the most ignorant and most recently arrived of the Italian settlers; (3) it was thickly populated; (4) it included some of the most insanitary streets of the city; and (5) it presented special problems on account of the superstition of the people and their lack of knowledge of the language of the country.

To get the best understanding of the problem and determine the most effective method of procedure, it was decided to limit the field work in the beginning to one city block, the most thickly populated and insanitary in the district. The first act of the workers was the taking of a census of the block, classifying its inhabitants. As we were primarily interested in the infants, the mothers were asked to take their infants to the Centre building for medical examination and guidance, and all expectant mothers were referred for the same purpose. As the confidence of the family was obtained, the insanitary conditions of the home were pointed out, their possible effect upon the health of the family made clear, and the methods of correcting them explained. In practically every household where infants were found it was necessary to correct the mother's lax methods in the care and feeding of her baby.

Whilst this field work was going on, the Centre building became an extremely active institution. The Centre and its purposes became so well known to the community that we were constantly appealed to for assistance in all sorts of emergencies.

Whilst we felt that our work was eminently successful, we realised that we only touched the surface. We have very broad plans for the future, which we hope to carry out in conjunction with the Health Department, which has joined with us in establishing the first health district in the City of Philadelphia.

One of the most important and helpful procedures during the control of the Child Federation was the close co-operation with the city departments.

The best measure of the success of work of this character is probably the death-rate amongst infants. The statistics covering divisions as small as those we were working in, have been so unsatisfactorily recorded in Philadelphia, that it has been impossible for us to make an effective com-

parison of the mortality before and after the Health Centre work began. We do know, however, that we have had an extraordinarily low death rate.

But we did not measure our results by this method alone. From the fact that we taught the mothers in all of the blocks in which we conducted our intensive work, their lessons well enough to stimulate them to bring their infants to us constantly that we might help them keep them well; and the fact that we taught dozens of families to feel the necessity of better living quarters than they could secure in the districts in which they had lived; and the fact that the care given the children by their mothers and the conditions of cleanliness of the homes and alleys improved so tremendously—we know that the work was effective. But the total results of work of this character can never be expressed fully in any report: indeed, they are appreciated only by those who have known the people and their homes both before and after the work has been done.

It would seem to matter little if the establishment of a district health department necessitated an increase in the appropriation for health work, if it can be shown that the health district is a more efficient method of preventing and controlling disease

Abstracts from Current Literature.

Acute Infectious Diseases.

The possible rôle of books in the dissemination of the contagious diseases ('*Bull. Johns Hopkins Hospital*,' 1916, xxvii, p. 183).—**C. A. Laubach**, as the result of numerous experiments, came to the following conclusions: (1) Pathogenic bacteria can seldom be isolated from books which have been handled by sick patients, and there is, therefore, no empirical reason for maintaining that books serve as vehicles of infection. (2) Direct sunlight and diffuse daylight are the most efficient germicides for organisms found on books, as they are for the same organisms under other conditions. (3) The fact that pathogenic bacteria, like the typhoid bacillus and diphtheria bacillus, can be recovered from artificially infected books under various circumstances after long periods of time, and the fact that the diphtheria bacillus does not lose in virulence during this period, are a sufficient reason for insisting upon the thorough disinfection of books which have been handled by patients.

J. D. ROLLESTON.

Diphtheria in the first year of life ('*Amer. Journ. Dis. Child.*,' 1916, xii, p. 47).—**J. D. Rolleston**.—Diphtheria in the first year of life is comparatively rare. Only twenty patients of this age were found among a total of 2600 patients of all ages. Of these, thirteen occurred during the second half, nearly twice as many as during the first six months of the year. Congenital syphilis is an important predisposing cause. Three patients showed unmistakable signs of the disease, and if the Wassermann test had been performed latent syphilis would have been revealed in several more. Sixty-five per cent. showed some nasal involvement with or without other diphtheritic lesions elsewhere, as compared with 25.6 per cent. in the total. Thirty per cent. were purely nasal as compared with 1.5 per cent. of the

total cases. Cutaneous diphtheria was also unusually frequent, viz. 15 per cent. as compared with 1.1 per cent. in the total. The mortality was high, 45 per cent., as compared with 7.3 per cent. in the total. Broncho-pneumonia caused five deaths, cardiac paralysis two deaths, and congenital syphilis two deaths. Paralysis was rare (two cases), broncho-pneumonia (six cases) was common. A history of infection was obtained in only three cases.

J. D. ROLLESTON.

Prolonged use of tubes following diphtheria (*Arch. of Ped.*, 1916, xxxiii, p. 161).—A. J. Bell.—A child, aged 1 year, was admitted to hospital for laryngeal diphtheria with a history of having been ill two weeks. After attempted intubation a low tracheotomy was performed. In spite of frequent attempts the tube could not be permanently removed till the thirty-first day. Treatment consisted chiefly in training the larynx by closing the opening of the tube and applying sudden pressure to the chest wall, with the result that the child uttered a distinct cry and coughed several times. This was repeated every few minutes for half-an-hour every day for several days. The stenosis was probably due in the first place to an acute oedema and subsequently to a psychic condition.

J. D. ROLLESTON.

The Schick toxin reaction for immunity in diphtheria (*Amer. Journ. Dis. Child.*, 1915, ix, p. 189).—J. A. Kolmer and E. L. Moshage, as the result of 1265 inoculations, came to the following conclusions: (1) The toxin skin reaction is a valuable and reliable method for detecting susceptibility to diphtheria. (2) Persons reacting negatively to this test usually contain at least $\frac{1}{40}$ units of diphtheria antitoxin per c.c. of serum, and this amount of antitoxin is probably sufficient to protect against infection. (3) Persons reacting weakly or strongly positive usually contain less than $\frac{1}{40}$ of a unit of antitoxin per c.c. of serum or none at all. These persons may be regarded as susceptible to diphtheria, and in the event of exposure to infection should be passively immunised with an injection of antitoxin. (4) About 40 to 50 per cent. of children ranging from 1 to 15 years of age react positively to the toxin test; this means that the preliminary use of the toxin test will eliminate the necessity of administering prophylactic doses of antitoxin to about 50 per cent. of children. (5) The toxin reaction indicates that the immunity conferred by an injection of antitoxin begins to disappear after ten days, and has generally passed away entirely after four weeks. (6) The increased susceptibility of persons with scarlet fever to diphtheria is shown by the toxin reaction; even after the injection of antitoxin about 10 per cent. are susceptible within ten days. (7) According to the toxin reaction the immunity conferred by an attack of diphtheria is usually of short duration or entirely absent. (8) The most practical application of the toxin reaction consists in applying the test as a preliminary measure to all persons who have been exposed to diphtheria and immunising only those who react positively.

J. D. ROLLESTON.

The Schick reaction and its applications (*New York State Journ. Med.*, 1916, xv, p. 118).—A. Zingher reviews some of the more important applications of the Schick reaction and emphasises the following points: (1) The absolute reliability of the test in showing the presence or absence of antitoxic immunity to diphtheria, a negative reaction indicating that the individual is protected, probably indefinitely, against the disease. (2) In

determining the efficiency of the active immunisation of susceptible individuals, who have been injected with a mixture of diphtheria toxin and antitoxin. For this purpose only positive Schick cases should be chosen, and after the injections they should be tested at intervals of one, three, six and twelve months to determine whether a sufficient amount of antitoxin has developed to inhibit the Schick reaction, showing thereby the production of an active immunity to diphtheria. (3) To clear up the diagnosis of clinically doubtful cases of diphtheria; with a purulent or sanious nasal discharge showing the Klebs-Loëffler bacillus it is difficult to decide whether the case is a carrier or a beginning diphtheria. A negative reaction excludes diphtheria, while a positive Schick reaction leaves the diagnosis of diphtheria still a probability. A case of tonsillitis due to the streptococcus in a carrier of diphtheria bacilli would, by the use of the culture alone, be thought to have diphtheria and in danger of extension of the disease. A negative Schick reaction would indicate the case to be simply a carrier, and in no danger from the effects of the diphtheria poison. (4) The Schick reaction has added further experimental proof to the clinical experience that very toxic cases of diphtheria require the early intravenous administration of large doses of antitoxin. (5) The results obtained with the Schick test in families seem to indicate that besides infection with virulent diphtheria bacilli, other factors, possibly hereditary in nature, are concerned in the production of natural immunity to diphtheria. (6) After an attack of diphtheria, the Schick test may be used to determine whether the individual has become immune to a second attack of the disease. (7) The use of the Schick test in carriers of diphtheria bacilli will be of service in showing the necessity of using antitoxin to protect those who react positively and who are to be operated upon for nose and throat conditions. (8) During an epidemic of diphtheria in an institution we may use the Schick test to advantage in controlling the spread of the disease. (9) In contagious disease hospitals the Schick test has a distinct value as a routine procedure at the time of admission in cases of scarlet fever and measles. (10) In many general hospitals the custom of giving every child on admission a passively immunising dose of antitoxin might be replaced with advantage by using the Schick test and only injecting the positively reacting patients. (11) In private practice, the use of the Schick test will save from immunising a large proportion of the adult members and many of the children in the family. In conclusion, the author expresses the hope that the ability to separate clinically those who are susceptible to diphtheria from those who are immune will arouse an interest in the more wide-spread use of an active immunisation to diphtheria (toxin-antitoxin) which will enable us to control and possibly finally eradicate the disease, some forms of which still have a mortality of from 30 to 40 per cent.

J. ALLAN.

Further observations on the Schick test for diphtheria immunity (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 1448).—**G. H. Weaver and B. Rappaport** announce that a slight modification in the technique of making the intracutaneous injection has been devised by Dr. Rappaport. The skin on the outer side of the arm is rendered tense by claspings the arm from behind. The needle is first thrust into the skin at right angles to the surface to a depth of about $\frac{1}{8}$ in. The direction of the needle is then changed so that if it were carried forward it would emerge about $\frac{1}{2}$ in. from the point of entrance. The needle is then carried forward in this direction

until the point is plainly visible within the epidermis. The injection is then made and the needle withdrawn. The advantages of this method over the old one are that it is less painful, requires less time and the danger of any escape of fluid from the puncture is obviated. The toxin has always been so diluted that $\frac{1}{30}$ minimum lethal dose was contained in 0.1 c.c. The test injection has been made on the outer side of the right arm, and at a corresponding point on the left arm was made a control injection consisting of the same amount of toxin plus several hundred times the amount of antitoxin required to neutralize the toxin. The mixture was so made that the amount injected was here also 0.1 c.c. The actual quantity of serum injected was from $\frac{1}{20000}$ to $\frac{1}{30000}$ c.c. of an antitoxin globulin solution. Several things of interest have been observed in connection with the control of toxin-antitoxin injections. Since the toxin is here neutralised, an entire absence of reaction is usually associated with a positive reaction in the test arm. A pseudoreaction is usually associated with a similar one in the control. A pseudoreaction in both arms sometimes subsides in two or three days, leaving a typical reaction in the test arm which runs a typical course. The control injections sometimes cause reactions which have no counterpart in the test arm, and are due to the serum injected. In persons who are hypersensitive to horse serum, a local reaction develops at the seat of injection. This usually appears within twenty-four hours, and consists of a bright redness, swelling and slight pain on manipulation. The area involved may be only a few centimetres in diameter or may extend half-way about the arm. These reactions were especially noted in persons who had received antitoxin some time before.

T. R. WHIPHAM.

The pseudo-reaction in the Schick test and its control ('*Journ Amer. Med. Assoc.*,' 1916, LXVI, p. 1617).—A. Zingher states that the pseudoreaction in the Schick test is caused, not by the soluble diphtheria toxin, but by the protein substance of the diphtheria bacillus which is present in the solution used for the test. The reaction may be obtained in individuals who have enough natural antitoxin to render them immune to diphtheria. It is important, therefore, to control these pseudoreactions, which are quite frequent in the adult, especially women (from 20 to 30 per cent.), but relatively rare in children. These control tests may be made after the reaction with the regular Schick test has developed, or, especially in the adult, the two tests may be made simultaneously, one on each forearm, and the clinical course of the reactions thus compared. For controlling the positive pseudo- and combined reactions, toxin which has been heated to 75° C. for five minutes is employed. By this means the soluble diphtheria toxin is destroyed, but the protein of the diphtheria bacillus is not appreciably affected. In an individual who gave a *positive* reaction only, the control test with the heated toxin will be negative. In one who gave a *pseudoreaction*, the control reaction will be of about the same size and appearance, and pass through the same clinical course as the original reaction; e.g., the two reactions showing a similar central area of redness of varying size, surrounded by a secondary areola which shades off into the surrounding skin. Both reactions begin to appear in about six to eighteen hours, reach their height in twenty-four to thirty-six hours, and disappear in three to four days, leaving a poorly defined area of pigmentation and generally no scaling.

In an individual who gave a *combined* reaction in the original test, both the positive and the pseudoreaction may be detected. The positive reaction

becomes manifest in the original test at the end of three to four days, when the pseudo-element of the reaction has disappeared, as a definite circumscribed area of redness, which measures from 1 to 2.5 cm. in diameter and shows superficial scaling with beginning brownish pigmentation. The pseudoreaction is detected in the control test with the heated toxin; the reaction will not be as marked as in the original Schick test, but passes through the typical clinical course of a false reaction. T. R. WHIPHAM.

Active immunisation with diphtheria toxin-antitoxin (*Journ. Amer. Med. Assoc.*, 1915, LXV, p. 2216).—W. H. Park and A. Zingher, as the result of further investigations, have come to the conclusion that individuals who, before treatment, give a negative Schick reaction are immune probably for life and, therefore, it is not necessary to inject them, when exposed, either with antitoxin or toxin-antitoxin. Those who give a positive Schick reaction and are exposed to diphtheria and in immediate danger should receive either antitoxin alone or, if a longer protection is desired, both antitoxin and toxin-antitoxin. For the general prophylaxis against diphtheria in schools and communities, excluding immediate contacts, a mixture of toxin-antitoxin alone (from 85 to 90 per cent. of the L + dose of toxin to each unit of antitoxin) or toxin-antitoxin plus vaccine of killed diphtheria bacilli is recommended. The dose is 1 c.c. of toxin-antitoxin and 1,000,000,000 bacteria injected subcutaneously and repeated three times at intervals of six or seven days. Sufficient time has not as yet elapsed to judge the value of adding the injections of the bacilli to the toxin-antitoxin. The early and the late results of active immunisation should be determined with the Schick test. Early results are those obtained by the application of the test within four weeks, and late results from four months to two years after the immunising injections.

T. R. WHIPHAM.

Diphtheria carriers (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 645).—F. L. Kelly and Violet M. Bathgate emphasize the necessity for taking cultures from the nose in the detection of diphtheria carriers. They found that in a school where there was an outbreak of the disease only 28 per cent. of all positive outbreaks were from the throat. Consequently 72 per cent. would have escaped detection if cultures from the nose had not been taken. They further lay stress on the value of the Schick test in distinguishing contacts from carriers.

T. R. WHIPHAM.

Studies on diphtheria (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 941).—H. O. Ruh, M. J. Miller, and R. G. Perkins find that tonsillectomy is a more rapid and more effective method for treating diphtheria carriers than either biological products or chemical substances.

T. R. WHIPHAM.

Removal of tonsils and adenoids in diphtheria carriers (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 810).—S. A. Friedberg advocates the removal of tonsils and adenoids from diphtheria carriers, as the bacilli promptly disappear after the operation. In recent cases it is advisable to wait two or three weeks after the recovery of the patient. In none of the cases treated did the operation have any different general effects than it has ordinarily.

T. R. WHIPHAM.

Treatment of diphtheria carriers with iodized phenol (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 800).—W. O. Ott and K. A. Roy advocate the local application of iodized phenol (phenol 60 per cent., iodine 20 per cent., and glycerine 20 per cent.) in cases of diphtheria carriers. In an infectious children's ward 17 cases were treated. Negative cultures were obtained after one application of iodized phenol in 6 cases (35 per cent.); after the second application in 5 cases (29 per cent.); after the third application in 2 cases (12 per cent.); after the fifth application in 1 case (6 per cent.), and after the sixth application in 2 cases (12 per cent.). One case (nasal) was under treatment for 21 days and required nine applications before negative cultures were obtained. With the exception of this case none of the other 16 were under treatment longer than 11 days. Fifteen of the cases were followed after leaving the hospital, and negative cultures obtained in all. No treatment had been used since the discharge of the patients from the hospital, and all of them had been out from 1 to 3 weeks when the cultures were made. No bad results have been noticed from the use of this rather strong preparation in the nose and throat. The application is painful for half a minute or less until the anæsthetic action of the phenol takes effect. There is a thin escharotic membrane formed at the site of application, which remains for about 24 hours. T. R. WHIPHAM.

The use of Kaolin to remove diphtheria bacilli from the nose and throat (*Journ. Amer. Med. Assoc.*, 1916, LXVI, p. 943).—B. Rappaport gives further evidence of the use of kaolin in removing diphtheria bacilli from the nose and throat. When properly applied, kaolin by its adsorptive power mechanically removes bacteria with which it comes in contact, and its application to the nose and throat helps to remove diphtheria bacilli and to shorten the period of quarantine after diphtheria. This action of kaolin is interfered with by various local pathological conditions, such as a septic or scarlatinal nasal discharge. Removal of tonsils and adenoids is indicated when diphtheria bacilli persist unduly in spite of kaolin (*vide BRITISH JOURNAL OF CHILDREN'S DISEASES*, 1915, XII, p. 349).

T. R. WHIPHAM.

The etiology of scarlet fever (*Journ. Med. Research*, 1916, XXXIV, p. 127).—F. B. Mallory and E. M. Medlar found on microscopical examination of the tissues of a child who died of scarlet fever on the day after the appearance of the eruption large and small masses of Gram-positive bacilli in some of the crypts of the tonsils. The bacilli lay in the upper part of the fibrino-purulent exudation covering the walls of the crypts. They were also present in practically pure culture in slight depressions and erosions in the epithelium of the tonsils, pillars of the fauces, soft palate, uvula, and root of tongue. They grew between and killed the epithelial cells, causing an exudation of polymorphonuclears. They were also found in the exudation of the trachea and in the broncho-pneumonic lung, in which they completely filled the alveoli and bronchioles. Fibrin formation was usually absent or slight. The bacilli stained well with ordinary dyes, had no polar bodies, were slightly smaller than diphtheria bacilli, and varied from coccus-like to large bacillary forms. The bacilli were facultative anaerobes. They grew best anaerobically on glycerin (3 per cent.)—dextrose (5 per cent.)—agar. They died out quickly in the lesions, so that after the second or third day following the eruption it was difficult or impossible to demonstrate them.

J. D. ROLLESTON.

Phlebitis in scarlet fever ('*Bull. et Mém. Soc. Méd. Hôp. de Paris*,' 1915, xxxix, p. 807).—**Nobécourt, J. des Camiers and Tournier**.—Phlebitis of the limbs is rare in scarlet fever. Among 262 scarlet fever cases in soldiers only two examples occurred. Both patients were aged 19 years. Neither had varicose veins nor showed any local predisposition for the localisation of the infection on their venous system. The complication appeared late, on the thirty-seventh and forty-fifth days especially. In the first case it was preceded, accompanied, and followed by articular rheumatism, endocarditis, and pericarditis, while in the second it was an isolated phenomenon. In the first case the left internal saphenous was affected, and in the second the veins of both sides. The symptoms were those of phlegmasia alba dolens. In both cases the course was rapid and recovery complete. Like endocarditis and pericarditis, phlebitis shows the tendency of the scarlatinal virus to be localised in the circulatory system.

J. D. ROLLESTON.

Some important factors affecting the incidence of measles and the fatality therefrom ('*Arch. of Ped.*,' 1916, xxxiii, p. 261).—**J. G. Wilson** writes from personal observation of 2191 measles cases of both sexes and practically all ages admitted to the Contagious Diseases Hospital at Ellis Island for June, 1911, to July, 1914. The total case mortality was 9.5 per cent. His conclusions are as follows: (1) Cross infection, especially that of diphtheria is the most serious event. Twenty of the 36 cases which contracted diphtheria died—a mortality of 66.6 per cent.; 13 of the 28 cases which contracted scarlet fever died—a mortality of 46.4 per cent., and there were 39 deaths among the cases which developed other contagious diseases—a mortality of 37.8 per cent. (2) Suppurative otitis media although the most frequent complication of measles—it occurred in 18 per cent. of these cases—is not of grave prognostic import when properly treated. (3) Broncho-pneumonia complicates about 10 per cent. of the cases, its frequency and fatality being but little influenced by the weather. (4) The fatality of measles complicated by broncho-pneumonia is 58 per cent., but varies in an exceedingly erratic manner and without marked relation to the total case mortality of measles. The incidence rate of broncho-pneumonia as a complication rather than its case mortality appears to be an index to the severity of any particular outbreak of measles.

J. D. ROLLESTON.

Concealed measles ('*New York Med. Journ.*,' 1916, ciii, p. 986).—**R. Opdyke**.—This was the case of a girl, aged 7 years. In the winter of 1914 she had a severe attack of pertussis, followed by influenza. As the latter subsided, ear pain on both sides appeared, relieved for a time by prompt incision in the membranes. The left ear recovered, but the right progressed to acute mastoiditis, necessitating operation. She progressed fairly well, but her throat inflamed, and temperature ranged from 103.5° to 105° F. Cultures negative. Symptoms of incipient meningitis appeared, but lumbar punctures were negative. Eight days after the mastoid operation measles rash came out, and, on its disappearance, meningitic symptoms manifested themselves. She died comatose, "black with a typical advanced form of measles." Autopsy was not permitted.

MACLEOD YEARSLEY.

Acute hemiglossitis in measles ('*Bull. et Mém. Soc. Méd. Hôp. de Paris*,' 1916, xl, p. 709).—**P. Sainton**.—A soldier on the third day of a mild attack of measles complained of difficulty in mastication, which was

attributed to a submaxillary and supra-hyoid adenitis. The following day his temperature rose to 100.2° F., and there was violent pain in the tongue, which could be protruded only with difficulty and felt numb. On palpation a firm non-fluctuating tumour was found on the right half 1 cm. from the tip. The tumour gradually increased, the general state became worse, and the temperature rose to 104° F. When abscess formation seemed probable, the tumour began to subside, and by the eighth day had completely disappeared. Sainton attributes the condition to infection of Blandin Nühn's gland, which is situated close to the tip of the tongue. The infection probably takes place by the excretory duct, and is an extension of the bucco-pharyngeal infection which is the rule in measles.

J. D. ROLLESTON.

Hæmorrhagic varicella ('*Brazil-medico*,' 1916, xxx, p. 173).—**F. de Lemos**.—A female infant, aged 4 months, developed varicella a few days after four other children in the same house who had an ordinary attack. When the eruption was well developed blood escaped from the vesicles, hæmorrhages appeared in the gums and on the ears, a large hæmatoma appeared on the head, and ecchymoses on the legs followed by epistaxis and hæmatemesis. Death occurred in three days. The hæmorrhagic form was possibly due to the fact that the child had previously suffered from infantile scurvy.

J. D. ROLLESTON.

Prophylactic vaccination for varicella ('*Arch. of Ped.*,' 1915, xxxii, p. 651).—**S. Rabinoff**.—Among 142 susceptible children, 114 or about 75 per cent. developed varicella. On 76 vaccination was performed with fluid from fresh varicella vesicles. Only 6 of non-vaccinated developed varicella, and all within the incubation period of the disease, *i. e.* 16 days. None of the vaccinated cases showed any systemic disturbance. In some the local reaction was very slight or *nil*, while in others in whom several scarifications were made, a red areola appeared about the tenth day, and went through the regular sequence of papule, vesicle, granule, and crust.

J. D. ROLLESTON.

Prophylactic vaccination against varicella ('*La Pediatria*,' 1916, xxiv, p. 328).—**G. Rutelli** during an epidemic inoculated fifteen healthy children free from syphilis or tubercle with the lymph from the vesicles. After 24 or 48 hours up to 5 days there was a strong local reaction having the following characteristics: A nodule more or less extensive in area, deep red, hard with smooth surface, occasionally the formation of a vesicle. For the first few days the redness increased in intensity, but by degrees the infiltration and redness ceased; when a vesicle formed a scab resulted. In one case only, after about twenty days a small abscess formed. None of these cases contracted varicella.

VINCENT DICKINSON.

Acute myelitis following varicella ('*Amer. Journ. Dis. Child.*,' 1915, ix, p. 445).—**D. C. Wharton Smith**.—A boy, aged 7 years, 2 weeks after an ordinary attack of varicella developed loss of power and sensation in both legs, and a few days later retention of urine, followed by incontinence both of urine and fæces, which lasted 6 or 7 weeks. The spinal fluid was normal and Wassermann's reaction was negative in the spinal fluid and blood. The fundi were normal. Gradual improvement took place, but 14 months after the onset there was still some spasticity in the lower limbs, and Babinski's sign was positive on both sides.

J. D. ROLLESTON.

A study of the fatality of chicken-pox, mumps, and German measles (*New York State Journ. Med.*, 1916, xvi, p. 422).—**L. R. Williams**, from a careful analysis of the causes of death in a series of cases of chicken-pox, mumps, and German measles, reaches these conclusions (1) It seems to be quite conclusive from a study of the reports of the physicians and from a study of the death certificates that chicken-pox itself is rarely a cause of death. In children weakened by constitutional disease, death may ensue as a result of the added burden of chicken-pox. Pyogenic infections may occur from infected vesicles. In a number of cases reported as death from chicken-pox the death was apparently due to some other cause in which chicken-pox was only an intercurrent disease and not the primary cause of death. (2) A careful study of the death certificates and a study of the doctors' statements makes it quite evident that although mumps may be a serious disease it is rarely the cause of death. It would seem that in many instances the diagnosis was questionable, and that although the death certificate was signed mumps, the infection of the parotid gland was in many instances very possibly due to oral infection. This is particularly noticeable in the number of elderly people who are said to have died of mumps. This is borne out by a study of the notes from the doctors' letters. (3) The German measles series was too small to justify any definite conclusions. It would appear that pulmonary complications are fairly frequent, broncho-pneumonia especially being a factor in the fatal issue in several cases.

J. ALLAN.

Typhoid fever in children (*Boston Med. and Surg. Journ.*, 1915, clxxiii, p. 565).—**K. G. Percy** analyses 308 cases treated at the Boston Children's Hospital since 1913. The ages ranged from infancy to 2 years. The mortality was 2.9 per cent. The conclusions are as follows: Typhoid fever is relatively common in childhood and far more prevalent in infancy than formerly supposed. Its onset is much the same as in the adult, headache, fever and malaise, and abdominal pain being the most frequent initial symptoms. In this series and a large series collected from literature, the spleen was enlarged in 71 per cent., rose spots were seen in 61 per cent., positive Widal tests were obtained relatively early in 88.2 per cent., the white blood count was below 10,000 in 73 per cent., the fever lasted an average of 25 days, relapses occurred in 11.8 per cent., intestinal hæmorrhages in 4.2 per cent., and perforation in 1.2 per cent. *Treatment*.—A high caloric bland diet suited to each individual is most important. Hydrotherapy takes a vital place in the treatment of the febrile and delirious stage. Enemata are essential in a high percentage.

J. D. ROLLESTON.

Typhoid fever in breast-fed children (*Pohclínica*, 1915, III, p. 916).—**J. A. Jordán** records three cases. (1) Infant, aged 14 months. The symptoms were emaciation, anæmia, profuse green diarrhœa, irregular pyrexia, noma, and great enlargement of the spleen. Malaria was at first suspected, and then kala-azar, but bacteriological examination showed that the disease was typhoid. (2) Infant, aged 9 months. Sudden onset with shivering, followed by sweating and a phase of complete apyrexia. These symptoms returned in a few days, so that malaria was diagnosed. Intermittent pyrexia was then replaced by a fever of an intermittent-remittent type and Widal's reaction was positive. There was no enlargement of the spleen. (3) Infant, aged 12 months. The disease began with abundant green diarrhœa, which continued throughout. The temperature was that of

a typical typhoid case, except that the final amphibolic stage was absent. There was no enlargement of the liver or spleen. Widal's reaction and a blood-culture were positive.

J. D. ROLLESTON.

Perforated typhoid ulcer ('*Lancet*,' 1916, II, p. 107).—F. M. Neild reports a case of perforation following a mild attack of typhoid fever in a boy, aged 10 years. An operation was performed but, on the ninth day after, acute intestinal obstruction developed, necessitating further surgical interference. Recovery followed and was uninterrupted, there being scarcely any rise of temperature after the second operation.

J. ALLAN.

Erysipelas migrans and multiple abscesses in a six months' old infant successfully treated with vaccines ('*Med. Record*,' 1916, LXXXIX, p. 734).—L. Fischer.—When first seen the child had been ill three days, the temperature was 105° F., and there was erysipelas of the vulva and abdomen. It spread thence to the buttocks, back, thorax, extremities, scalp, and face. Lukewarm colonic flushings and tub baths failed to reduce the temperature. Icthyol and saturated solution of magnesium sulphate were also useless, but streptococcus vaccines, both stock and autogenous, brought down the temperature by lysis. On the fifth day following the first vaccine injection an abscess on the right labium majus was incised. A general furunculosis on the arms, scalp, thighs, back, and face appeared in rapid succession. Breast-feeding was continued throughout the illness and complete recovery took place.

J. D. ROLLESTON.

Cerebro-spinal meningitis in children ('*Med. Journ. Austral.*,' 1915, II, p. 438).—N. J. Bullen gives notes of 55 cases which he divides into two groups, aged under 12 months and over 12 months. There were 20 of the former, all showing the characteristics of posterior basic meningitis. The onset was sudden, accompanied by vomiting, drowsiness, and in 5 by convulsions. They soon became semi-comatose with rigidity and retraction of the neck. A few of these were pulmonary cases, and all died, and in 2 a purpuric rash developed. Bulging of the fontanelle always occurred. Convulsions occurring early were of bad omen. Constipation was always present. Second group: 35 cases. The onset was sudden in 28. There were only 2 clinical stages: septicæmic, very short, and meningeal. Three varieties were noted: fulminant, acute, and sub-acute cases. Vomiting at the onset was noted in 20 cases, headache in 10, constipation in 12, convulsions in 5, rigors in 4. Delirium developed in about half, *tache cérébrale* in 19 cases, strabismus occurred in 9, conjunctivitis in 10, irido-cyclitis in 4, corneal ulcer in 1: opisthotonus in 15; herpes in 13, purpura in 16, petechial rash in 6, arthritis in 4: the incubation period lasted from 24 hours to 5 days. The disease is especially fatal under 18 months of age. Lumbar puncture is the best treatment. Vaccines were used in very large doses in most of the cases, and were effective especially in the fulminant and acutely toxic cases. The results were: Group 1.—Five recovered, 9 died, 6 under treatment. Group 2.—Thirteen recovered, 7 died, and 15 were still under treatment.

F. R. B. ATKINSON.

Epidemic cerebro-spinal meningitis ('*La Pediatria*,' 1916, XXIV, p. 449).—G. di Cristina, from his experience of the epidemic in Palermo in 1915-16, states that the disease is an infection peculiar to childhood, the

exception to the rule being soldiers. In infants the symptomatology differs from the usual clinical picture and is very variable. The onset is insidious, and resembles an attack of influenza lasting several days, with cough, lachrymation, nasal discharge and slight opisthotonus. The classical symptoms then gradually supervene. Two forms may be distinguished, the spasmodic and the painful. The two most serious complications met with were nephritis and hydrocephalus. In protracted cases where the meningococcus was difficult to find or even to cultivate in the cerebro-spinal fluid, the author found help in the Vincent-Bellot reaction, which successfully demonstrated the presence of specific antigen.

VINCENT DICKINSON.

Extensive purpuric eruptions in epidemic meningitis (*Amer. Journ. Dis. Child.*, 1915, x, p. 266).—**E. A. Morgan**.—The early history of the disease shows that eruptions were more frequent than at present, probably because other forms of the disease were not recognised. Morgan reports 2 sporadic cases in children, aged 15 months and 2 years, presenting the following unusual features: (1) The character and distribution of the eruption, which was unlike the usual purpura hæmorrhagica, and which, though differing greatly in degree, was almost identical in both. (2) Paucity of meningeal signs. (3) Demonstration of the meningococcus in the blood, though attempts to grow it from the skin were unsuccessful. (4) Refutation of the old theory that the extent and colour of the eruption were of prognostic aid. In both cases the meningeal symptoms were not unusually marked, and were quite amenable to treatment.

J. D. ROLLESTON.

Meningococcus carriers in attendants on meningitis cases (*La Pediatria*, 1916, xxiv, p. 473).—**M. Sindoni** found that during an epidemic in the clinic the meningococcus was not always demonstrable in the patients by the means hitherto available, and that here its absence was in direct relation to the duration of the disease and the treatment adopted. The mothers of children affected were always carriers and constituted a grave peril for the diffusion of the disease. In the hospital staff carriers were rarely found. In the hospital they are not dangerous, but may communicate the disease to their families.

VINCENT DICKINSON.

Cases of epidemic cerebro-spinal meningitis treated with Flexner's antimeningitis serum (*Amer. Journ. Dis. Child.*, 1915, ix, p. 418).—**W. A. Smith** records 5 cases in children, aged from 8 months to 6 years, the duration of whose illness ranged from 4 hours to 23 days. All recovered without sequelæ. According to the severity of the case from one to eleven lumbar punctures were done, from 20–40 c.c. of fluid removed, and from 15–40 c.c. of serum injected. Marked reactions followed the injections. There were frequently high fever and restlessness, but they were of short duration.

J. D. ROLLESTON.

Otology, Rhinology, and Laryngology.

The discharging ear (*Med. Record*, 1916, xc, p. 588).—**A. Bardes** discusses this well-worn subject. Its chief merit lies in the stress which he lays upon two things: (1) that it is useless to attempt to check a discharging ear by local measures so long as reinfection from the nose is apt to occur, and (2) that the original expectations of the radical mastoid operation

have not been realised; in other words, the radical mastoid operation does not cure every case. Probably, in children, it is better whenever possible to do a simple opening operation (Schwartz) as more likely to preserve hearing.

MACLEOD YEARSLEY.

Obscure manifestations of otitis media in infancy and childhood (*Arch. of Ped.*, 1916, xxxiii p. 434).—**J. A. Colliver** points out that he is not an otologist, but wishes to call attention to a neglected and vitally important field. He feels that the burden of responsibility for the number of cases of ear disease in childhood which are neglected, overlooked, or wrongly diagnosed rests upon the general practitioners. He lays stress upon the not infrequently obscure nature of the symptoms of otitis media as well as upon the often unnecessary mastoid operation. He discusses the etiology of ear disease in infancy, with special reference to scarlet fever, measles and influenza. A most important paper that should be read in its entirety.

MACLEOD YEARSLEY.

Suppurative otitis media (*Canad. Med. Assoc. Journ.*, 1916, vi, p. 516).—**E. H. White** urges two points, both of which are important. (1) At the onset of an acute suppurative otitis insist on strict confinement to bed until it is established that the infection is a mild one, and that the disease is running a favourable course. (2) Put a limit to the time such an ear will be allowed to discharge by a thorough investigation as to the cause of delayed healing and the adoption of active surgical measures in appropriate cases. Remember that *every added week of discharge* makes it more certain that the *hearing will be permanently damaged* and brings nearer the danger of serious deep-seated trouble. Let your motto be the popular cry of the day "safety first."

MACLEOD YEARSLEY.

Infection of the ear with Vincent's micro-organisms—Report of sixteen cases (*Ann. of Otology*, 1915, xxiv, p. 485).—**J. A. Mulholland**.—The points about this infection are (1) The fact of its occurrence in debilitated children, (2) its apparent contagiousness, (3) its amenability to local treatment, and (4) its good prognosis. Of the 16 cases, 13 were confined to the middle ear, 3 had mastoiditis (2 of which were inoperable and died of meningitis; both had complete facial paralysis). General treatment was symptomatic. In the last 4 cases salvarsan was used (in one case syphilis was excluded by the Wassermann examination).

MACLEOD YEARSLEY.

The salt water ear (*Med. Record*, 1916, lxxxix, p. 912).—**H. B. Blackwell** has noted, during the past ten years, the number of cases of acute infections of the middle ear due to sea bathing, and considers that physicians should warn all patients coming under the following classifications against sea bathing: (1) Those with a history of having had suppuration from one or both ears. (2) Those with discharging ears. (3) The deaf. (4) Individuals who complain of itching in the external auditory canals. In making an aural examination, one should look specifically for the following conditions: (1) Acute, subacute, or chronic middle-ear suppuration. (2) Dry perforation of the tympanic membrane. (3) Partial or complete destruction of the tympanic membrane caused by previous suppuration, resulting in its replacement by connective tissue. (3) Eczema of the canals. In any of these conditions the ears should be plugged before

entering the water. Furunculosis often occurs in daily surf bathing, because of the dryness of the skin due to frequent submersions resulting in subsequent infection of the unprotected hair follicles.

MACLEOD YEARSLEY.

Syphilitic diseases of the ear (*Edin. Med. Journ.*, 1916, xvii, p. 5).—**J. S. Fraser**.—This is a most valuable *résumé* of recent literature and should be read carefully by all pædiatrists, as it deals with treatment in congenital syphilitic deafness in children.

MACLEOD YEARSLEY.

Spontaneous gangrene secondary to otitis and adenitis (*Riv. di Clin. Pediat.*, 1916, xiv, p. 57).—**A. F. Canelli** reports the case of a girl, aged 21 months, suffering from purulent otitis media and acute secondary parotitis followed by paratonsillar abscess and a severe septic condition with multiple gangrene, roughly symmetrical, involving the skin, and deeper tissues down to the muscles. There was a tubercular family history and a positive Wassermann. The condition was probably due to embolism.

VINCENT DICKINSON.

Mastoiditis complicated by purulent cerebro-spinal meningitis (*Journ. Amer. Med. Assoc.*, 1916, lxxvii, p. 201).—**W. H. Huntingdon** reports the case of a girl, aged 8 years, who had sudden pain in the left ear, headache, and fever without any history of previous otorrhœa. The drum, which was slightly red, was incised, but no pus was evacuated. Three days later there were more evident signs of mastoiditis and in addition those of meningitis. A mastoid abscess was opened and lumbar puncture was performed, the cerebro-spinal fluid being cloudy and containing an excess of polymorphonuclear leucocytes. The only organism present was the Friedländer bacillus. The patient made a good recovery.

T. R. WHIPHAM.

The vaccine treatment of suppurative otitis media (*Ann. of Otolology*, 1915, xxiv, p. 785).—**G. M. Coates**.—The author's deductions are admittedly optimistic—"a certain allowance," he says, must be made "for the rose-coloured spectacles" he "may be presumed to be looking through." His cases are considered under two headings: *Acute* and *Chronic*. He warns the reader not to give vaccines too much credit in the former, since many cases get well without them. But he prefers to use them than to follow Heath's advice. In the chronic cases, vaccines are most valuable as an adjunct to the mastoid operation. In 46 cases, 39 dry ears were obtained by the use of commercial mixed vaccines, with an average of 5 doses.

MACLEOD YEARSLEY.

A Clinical study of sixty cases of post-nasal infections in private practice, with reports of six cases, complicated by acute hæmorrhagic nephritis (*Arch of Ped.*, 1916, xxxiii, p. 729).—**G. E. Baxter**.—An interesting and instructive paper which may be summarised thus: (1) Post-nasal infections in infancy and childhood were unusually common in the winter and spring of 1915. (2) The cases studied bacteriologically did not show the prevalence of streptococcus, but usually a pure culture of staphylococcus. (3) There was a predilection for the infection to localise in the post-nasal space, and in more than 75 per cent. of the cases to involve the middle ear. (4) The evident importance of the post-nasal space

as the atrium for general infection. (5) The susceptibility of the kidneys to the toxins of the infection, in older children this occurred in 33 per cent. of the cases after the third year. (6) It is important not to be hasty in doing a paracentesis in all cases of involvement of the middle ear, especially in infants under 2 years. (7) The use of a nasal douche with gravity pressure is to be recommended in the treatment of post-nasal infections in a majority of cases.

MACLEOD YEARSLEY.

The indictment of the tonsil ('*Ann. of Otology*,' 1915, xxiv, p. 747).—**C. Gile.**—An interesting paper showing how the tonsil may be the *fons et origo* of acute nephritis, rheumatism, arthritis, goitre, tuberculosis, deafness, and various neuroses such as: œsophageal spasm, recurrent cough, spasm of the glottis, lingual neuralgia, and blepharospasm. That chorea and epidemic cerebro-spinal meningitis may also be traced to a tonsillar focus of infection is not mentioned but, as the author remarks, the charges in the indictment might be multiplied.

MACLEOD YEARSLEY.

The conservative treatment of the tonsils ('*New York Med. Journ.*,' 1916, ciii, p. 483).—**G. Hudson-Makuen** again approaches this much-discussed subject, but his paper is well worth reading because it contains one or two maxims deserving of note. In the normal state the tonsil is not a menace, but a probable protection, and its presence is helpful in phonation and articulation. It is easier to remove a tonsil than it is to know whether or not it should be removed. Whilst the temptation to remove tonsils in a somewhat wholesale manner is almost irresistible, the practice is none the less reprehensible. "The man who tonsillectomizes a dozen or fifteen patients in a single afternoon had better spend his afternoons in the abattoir." Finally, the tendency of the future will be to find out, not how to operate, but how not to operate, or, at least, how to operate in the most conservative manner.

MACLEOD YEARSLEY.

The standard tonsillectomy ('*Ann. of Otology*,' xxiv, p. 591).—**J. R. Fletcher** advocates dissection and wire snare. The following points are emphasised: (1) Save all the membrane possible; (2) make incision entirely around the tonsil; (3) employ sharp dissection rather than force; (4) beware of the posterior pillar; (5) remember that the snare is not an innocent instrument that cuts where it should; (6) most important, see all that is done.

MACLEOD YEARSLEY.

The dangers and complications of tonsillectomy ('*Med. Record*,' 1916, xc, p. 972).—**S. E. Moore.**—These are hæmorrhage, nervous and muscular diseases, sepsis, endocarditis, diphtheria, bronchiectasis, pulmonary embolism, hyperpyrexia, subcutaneous emphysema, pneumonia and pleurisy, rheumatism, status lymphaticus, amygdalotomy rash, dryness of the throat, appendicitis, adhesions of the pillars, impairment of the voice, difficult swallowing, otitis media, cervical adenitis, anæsthetic fatalities, leukæmia, enuresis, hyperthyroidism, nephritis, increased colds, epileptiform convulsions, and acidosis. Thousands of unnecessary tonsillectomies are performed yearly. The operation should be done in hospitals and by specialists only. Mere uncomplicated tonsillar hypertrophy does not require operation. Practically complete tonsillar involution occurs about puberty. The coagulation time of the blood should be taken in all cases, and no operation should be performed when the clotting time is more than one

and a half minutes. Shock can be avoided by using ether. No patient should be operated on with a high temperature, or where the constitutional or local condition is acute, as in arthritis, neuritis, coryza, tonsillitis, habit spasm, or convalescence from influenza. Operation should be avoided in the winter months owing to the great liability to bronchitis. More attention should be paid to oral asepsis both before and after operation. Tincture of iodine and compound tincture of benzoin are useful applications after operations.

J. D. ROLLESTON.

Eye adenoids and their relation to throat adenoids—the author's modification of the adenotonsillectomy operation—(' *Ann. of Otology*, 1915, xxiv, p. 763.—**J. E. Oertel** concludes that (1) eye adenoids (follicular conjunctivitis) indicate the existence of throat adenoids; (2) hasty and rough surgery in the throat is productive of irreparable damage; (3) adenectomy should be performed, as far as possible, under direct observation; (4) the roller forceps for diffuse pharyngeal adenoids is of value because it removes them with a minimum amount of damage to the mucous membrane; (5) the silver clip is the best general method of controlling tonsillar bleeding.

MACLEOD YEARSLEY.

Retropharyngeal abscess opening into the left bronchus (' *La med. de los niños*', 1916, xvii, p. 152).—**Sarabia** records a fatal case in an infant aged 10 days, in whom the abscess was due to manipulations of the mouth and pharynx at birth to facilitate respiration.

J. D. ROLLESTON.

Evacuation of retropharyngeal and tonsillar abscesses without a bistouri (' *Arch. de Méd. des Enf.*', 1916, xix, p. 449).—**J. Comby** records 45 cases, 18 of which were retropharyngeal and 27 tonsillar abscesses, successfully treated by the method which he had recommended in 1912 (v. BRITISH JOURNAL OF CHILDREN'S DISEASES, 1912, ix, p. 187), i. e. opening them with a blunt instrument such as a grooved director and enlarging the opening with an artery forceps.

J. D. ROLLESTON.

Aneurysm of the carotid simulating retropharyngeal abscess in an infant of 11 months (' *Jahrb. f. Kinderheilk.*', 1916, lxxxiii, p. 493).—**J. Vas.**—Profuse hæmorrhage followed incision of the retropharyngeal swelling, and tracheotomy was performed as a preliminary measure to ligaturing the carotid. Death occurred, however, shortly after tracheotomy, and the necropsy revealed a retropharyngeal aneurysm in the left internal carotid. Vas attributes the condition to an infection of the retropharyngeal lymph tissue round the internal carotid secondary to an angina.

J. D. ROLLESTON.

Some methods useful in direct laryngoscopy (' *New York State Journ. Med.*', 1916, xvi, p. 16).—**C. J. Imperatori** points out that in children and especially in infants, if the examination is prolonged, there is marked danger of inducing œdema of the larynx, particularly should the operator have any difficulty in the procedure. In children neither atropine nor morphine should be given, but chloral per rectum (10 gr. to a child 4 years of age and graduating the dose for younger children), one hour before the examination, and the child properly swathed and properly held, will invariably meet with success. A general anæsthetic may sometimes be required, but the great majority of cases can be operated under local anæsthesia. In children

cocaine is not used and alypin seems to be a safe substitute. In children, the straight position on the table is to be recommended. An assistant or nurse steadying the head, and the child swathed, will be found to aid in the success of the procedure. The upright position may be used, the child being properly swathed and held by an assistant who sits on a low chair or stool.

J. ALLAN.

A rare complication of diphtheritic tracheal and laryngeal stenosis (*'Deutsch. Med. Woch.,'* 1916, XLII, p. 323).—**T. Cohnen**.—A girl, aged 2 years, was admitted to hospital with faucial and laryngeal diphtheria in a state of urgent dyspnoea. Tracheotomy was performed at once under light chloroform anaesthesia. On opening her trachea an attempt to introduce the tube was checked by a soft obstacle, part of which passed through the incision, and proved to be an *ascaris lumbricoides* 10 cm. long. It was then extracted by forceps, and complete recovery took place.

J. D. ROLLESTON.

Paper-clip in bronchus for seventeen years (*'Journ. Amer. Med. Assoc.,'* 1916, XLVI, p. 397).—**E. Beer** reports the case of a male patient who, when 9 years of age, put a paper-clip into his mouth, which suddenly became lodged near the base of the tongue. His father in attempting to remove it with a teaspoon pushed it still further down the patient's throat, and it was believed that he had swallowed it. The next day he had a paroxysm of coughing, bringing up a large quantity of mucus and blood, and had great difficulty in breathing. He was taken to hospital, but as the symptoms subsided nothing was done. A few days later he had pneumonia, which relapsed. For the next two years he had fairly good health, and then noticed a dull pain in the right side of the chest, which was accompanied by a hacking cough, profuse muco-purulent sputum, and a sense of suffocation. He was treated for some time for tuberculosis and asthma, but the symptoms became worse, although his weight did not decrease. X-ray examination showed a shadow of a flat-headed paper-clip in the right main bronchus, with head down, and marked thickening of the adjacent pulmonary tissue. The clip was removed by superior bronchoscopy and the patient made a good recovery.

T. R. WHIPHAM.

Endoscopy of the œsophagus and upper air-passages in children (*'New York State Journ. Med.,'* 1916, xvi, p. 456).—**C. J. Imperatori** thinks that endoscopy of the œsophagus and upper air-passages in children and also in adults should be made use of more than it is, as a means of precise diagnosis. The common notion regarding endoscopy is to intimately associate it with removal of foreign bodies. While this is certainly a brilliant and spectacular procedure, still the use of endoscopy as a means of diagnosis and treatment, other than surgical, makes it a useful and practical means and is surely an advance in medical progress. The author discusses indications for examination of the œsophagus, indications for examining the larynx and tracheo-bronchial tube, methods of examination of the air-passages, preparation and position of the patient, and other points connected with the technique of endoscopy.

J. ALLAN.

Review.

OBSTETRICS, NORMAL AND OPERATIVE. By GEORGE PEASLEE SHEARS, B.S., M.D., Professor of Obstetrics and Attending Obstetrician at the New York Polyclinic Medical School and Hospital, Philadelphia and London. 419 Illustrations. Pp. 745. 1916. J. B. Lippincott Company. Price 25s. net.

THIS work, which is the outcome of extensive experience in the hospital private and consulting practice of obstetrics, is divided into four parts, the first dealing with pregnancy, labour and the puerperium, the second with the pathology of pregnancy and labour, the third with obstetric surgery, and the fourth with the pathology of the puerperium.

The author points out that the practice of obstetrics differs from that of general medicine and surgery and from that of the other specialities, principally in the fact that the obstetrician has two patients under his care at the same time. It is for this reason and on account of the frequency with which it is performed that he regards the use of the forceps as the most important operation in all surgery.

Throughout the work he exacts a high standard from the practitioner and nurses engaged in obstetric work, and repeatedly insists that if a man cannot afford the time necessary to do justice to his patient he should adopt a less arduous calling than that of an obstetrician.

As regards nurses he remarks, doubtless alluding to the Continent and excluding this country: "In Europe, trained nursing, as we know it, simply does not exist" (p. 684).

Dr. Shears is a sworn foe of meddlesome midwifery, as is shown by his limitation of internal examination, his prohibition of hot douches after normal labour, the unnecessary use of the catheter, and of the tight breast bandage. Operative interference, he thinks, has on the whole done more harm than good in puerperal infection.

His discussion of "Twilight Sleep" and his substitute therefore will be read with interest (pp. 157-162).

He is generally in favour of ether as an anæsthetic in preference to chloroform.

Dr. Shears writes in a forcible style which grips our attention. His descriptions are accompanied by a wealth of illustrations, among which we may draw special attention to the excellent photographs of normal labour.

We have noticed a few misprints, *e.g.* uterine cornea (p. 5), endometritis (p. 223), cuoc en retour (p. 283), hæmiplegia (pp. 306 and 732), atelectasis (p. 425), empyæmia (p. 696).

We may also mention that the word "obstetrician" is not derived from the Greek (p. 170), and that icterus gravis does not mean icterus gravidarum (p. 280).

These trivial errors will doubtless be corrected in the next edition.

J. D. R.